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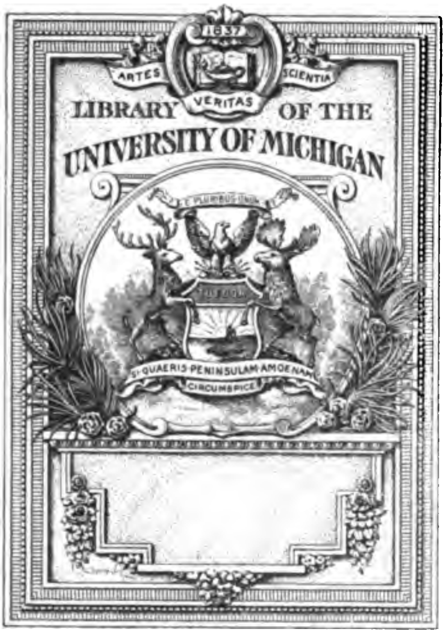
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THE
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HORATIO HALE

THE
AMERICAN ANTHROPOLOGIST

WASHINGTON, D. C., JANUARY, 189[illegible] No. 1

TUSAYAN TOTEMIC SIGNATURES

BY J. WALTER FEWKES

[illegible] have designated the clan [illegible] Walpi, Sitcomovi, [illegible] in dealings with [illegible] to prominent [illegible] signatures [illegible] their names [illegible] In [illegible] Awatobi, Sikyatki [illegible] a number [illegible] and from [illegible] were [illegible] totemic signatures [illegible] of Walpi, Sitcomovi [illegible]

[illegible] or soubriquet [illegible] relationship to the name of the [illegible] as [illegible] is not known [illegible] Indians have [illegible] of the [illegible] Pueblos of the Rio Grande, [illegible] spoken and Spanish [illegible] Pueblo Indians.

[illegible] to inscribe his name [illegible] phenomenon amply illustrated [illegible] Southwest. The [illegible] or Ind[illegible]

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VOL. X WASHINGTON, D. C., JANUARY, 1897 No. 1

TUSAYAN TOTEMIC SIGNATURES

J. WALTER FEWKES

In a former article[1] I have designated the clans of the Hopi pueblos of the East mesa—Walpi, Sitcomovi, and the Tanoan village of Hano. At diverse times in dealings with the Tusayan Indians I have had occasion to procure their signatures, and, as they were unable to write their names, I have obtained their marks or totemic signatures. In paying Indian workmen employed at the ruins of Awatobi, Sikyatki, and Homolobi in the summers of 1895 and 1896, a number of these signatures were collected on subvouchers, and from a petition[2] to the Government a few years ago many more were copied; so that I am now familiar with the totemic signatures of the heads of all the most important families of Walpi, Sitcomovi, and Hano, and of some of the other villages.

The every day name or soubriquet of an Indian has no necessary relationship to the name of the clan to which he belongs, and in ordinary usage he is not known by the name of his clan. A number of the Tusayan Indians have English and a few Spanish names. The absence of the latter among the Hopi is in contrast to the Pueblos of the Rio Grande, where an Iberian patois is commonly spoken and Spanish surnames are almost universal among Pueblo Indians.

The tendency in man to inscribe his name in conspicuous places is a psychic phenomenon amply illustrated by several races in the Southwest. The totemic signatures or Indian

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[1] American Anthropologist, Oct., 1894.

[2] The totems on this petition were obtained by the late Mr A. M. Stephen while in the employ of the Hemenway Expedition.

HORATIO HALE

names are found on rocks, cliffs, and walls of ancient ruins side by side with names of Spanish, Mexican, and American visitors. These present an instructive field of study. The Indian pictographs are of interest to the ethnologist; the Spanish and American inscriptions often afford valuable historical material to the historian. All, even the scribblings of the vandal, show the identity or unity of a psychic tendency which is limited to no race of man.

As the totemic signatures or pictographs of the ancient people are identical with those now made by the Pueblos, it is instructive to compare them, and as a contribution to the interpretation of the ancient rock etchings indicate the modern recognized meaning of their survivals.

The aim of this article is to consider the totem signatures of the Hopi Indians as a key to the meaning of many of the pictographs in Arizona. The material is classified according to the phratries considered in a previous article.[1]

Ala (*Horn*)

1.[2] Hayi (Walpi).
The totem represented by this man was a figure of an antelope, but he signed for his nephew, the hereditary "governor" of Walpi.

2. Hahawi (Sitcomovi, obiit 1892).
This man functioned for his nephew as asperger in the secret ceremonials of the Antelopes (see Snake Dance). He belonged to the Sowünwû (Deer) clan. Totem, figure of an antelope or deer.

3. Sikyaventiwa (Walpi).
He belongs to the Pañwû (Mountain Sheep) clan. Totem, hoofprints of mountain sheep.

4. Wupa (Walpi).
Lenya (Flute) gens; totem, flute.

Patki (*Water-house*)

5. Küwanmaca (Cuñopavi).
Pavatiya (Tadpole) gens; totem, tadpole.

6. Lomakele (Cuñopavi).
Omowûh (Rain-cloud) gens; totem, rain-cloud.

7. Küwanhoiyama.
Kaü (Corn) gens; totem, corn-plant.

---

[1] Kinship of the Tusayan Indians: American Anthropologist, May, 1894.

[2] Arabic numerals refer to numbers on the plates.

8. Supela (Walpi).
    Patki gens; totem, rain-cloud, lightning, corn-plant. Father of Kopeli (Snake chief), husband of Saliko, oldest woman of Snake clan.
9. Kwatcakwa (Walpi).
    Patki gens; totem, rain-cloud. Chief of the Sun-priests.
10. Tcoshoñiwa (Sitcomovi).
    Patki gens; totem, rain-cloud.
11. Sakwistiwa (Walpi).
    Patki gens; totem, rain-cloud and corn-plant.
12. Anawita (Sitcomovi).
    Patki gens; totem, rain-cloud and corn-plant. Chief of the Kwakwantû or Agave (Eagle-agave) priesthood.
13. Sakñüiva.
    Nüva (Snow) gens; totem, rain-cloud and corn-plant.
14. Kwaa (Walpi).
    Kaü (Corn) gens; totem, rain-cloud and corn-plant.
15. Küwanyuwa.
    Omowûh (Rain-cloud) gens; totem, rain-cloud.
16. Nakwaventiwa (Micoñinovi).
    Patki gens; totem, rain-cloud.
17. Naiyucinima.
    Kaü (Corn) gens; totem, corn-plant.
18. Lomaiyücva (Cuñopavi).
    Omowûh gens; totem, rain-cloud.
19. Lomahoiniwa (Oraibi).
    Omowûh gens; totem, rain-cloud.[1]

The trail of migration of the Patki people was from the far south, Palatki, and they have been traced at Homolobi and Chaves Pass, where their pictographs are still to be seen with those of other Hopi gentes from that region. Perhaps the most striking symbol which they brought from the far south was the semicircular[2] rain-cloud figure so often depicted in the totem signatures.

Tcüa (Snake)

20. Kopeli (Walpi).
    Tcüa (Snake) gens; totem, rattlesnake. Chief of the Snake priests.

---

[1] The symbol of a rain-cloud in the form of a semicircle, with dependent lines representing falling rain, was brought to modern Tusayan from the far south. I have found it in a food bowl from a cemetery at Chaves Pass.

[2] The terraced rain-cloud symbol is likewise used in Tusayan. The Kwakwantu Society (see No. 12) or the Eagle-Agave (kwahu, eagle; kwan, agave) reminds one of the national symbol of Mexico (eagle on cactus, a Nahuatl conception). The similarity of the Hopi and Nahuatl words for eagle is evident to philologists. This society, according to tradition, brought the cult of the Plumed Serpent to Tusayan.

The peculiar totem signature of the Patki, Tabo, Squash, Paroquet, Crane, Earth, Lizard, etc, may be expected in pictographs near the ruins along the Little Colorado south of Tusayan, and along the Hopi trail through Chaves Pass and along Verde valley. The traditionists of the first-mentioned family say that their ancestors left their totems on the rocks in the far south. I have seen them on bowlders in great abundance near ruins of the Homolobi group at Winslow, between 70 and 80 miles south of Walpi. Pictographs of women with two whorls of hair occur in Clear Creek canyon, several miles south of the Atlantic and Pacific railroad. I believe they were made by Hopis, ancient or modern.

Honauûh (*Bear*)

60. Nasiheptüwa (Cuñopavi).
    Honauûh gens; totem, bear's paw. Chief of the pueblo.
61. Lahpü (Oraibi).
    Honauûh gens; totem, bear's paw.
62. Tawahoñnima (Walpi).
    Honauûh gens; totem, bear's paw.
63. Lomahoñava (Walpi).
    Honauûh gens; totem, bear's paw.
64. Honani (Cipaulovi).
    Piyuküc gens; totem, bearskin robe.[1].
65. Lololoma (Oraibi).
    Honauûh gens; totem, bear's paw.
66. Cakhoñyoma (Oraibi).
    Honauûh gens; totem, bear's paw.
67. Lomaiyamtiwa (Cuñopavi).
    Honauûh gens; totem, bear's paw.
68. Hümimüiniva (Cipaulovi).
    Honauûh gens; totem (nata), bearskin robe.
69. Sikyaletutiwa (Cipaulovi).
    Honauûh gens; totem, bear's paw.
70. Küwaukwatiwa (Walpi).
    Tcoro gens; totem, bird (*sp.* ?).

Katcina (*Katcina*)

71. Kuwanwainiwa (Oraibi).
    Buli (Butterfly) gens; totem, butterfly.
72. Sikyamüiniwa (Oraibi).
    Katcina gens; totem, head of Tatcükti (Mud-head).

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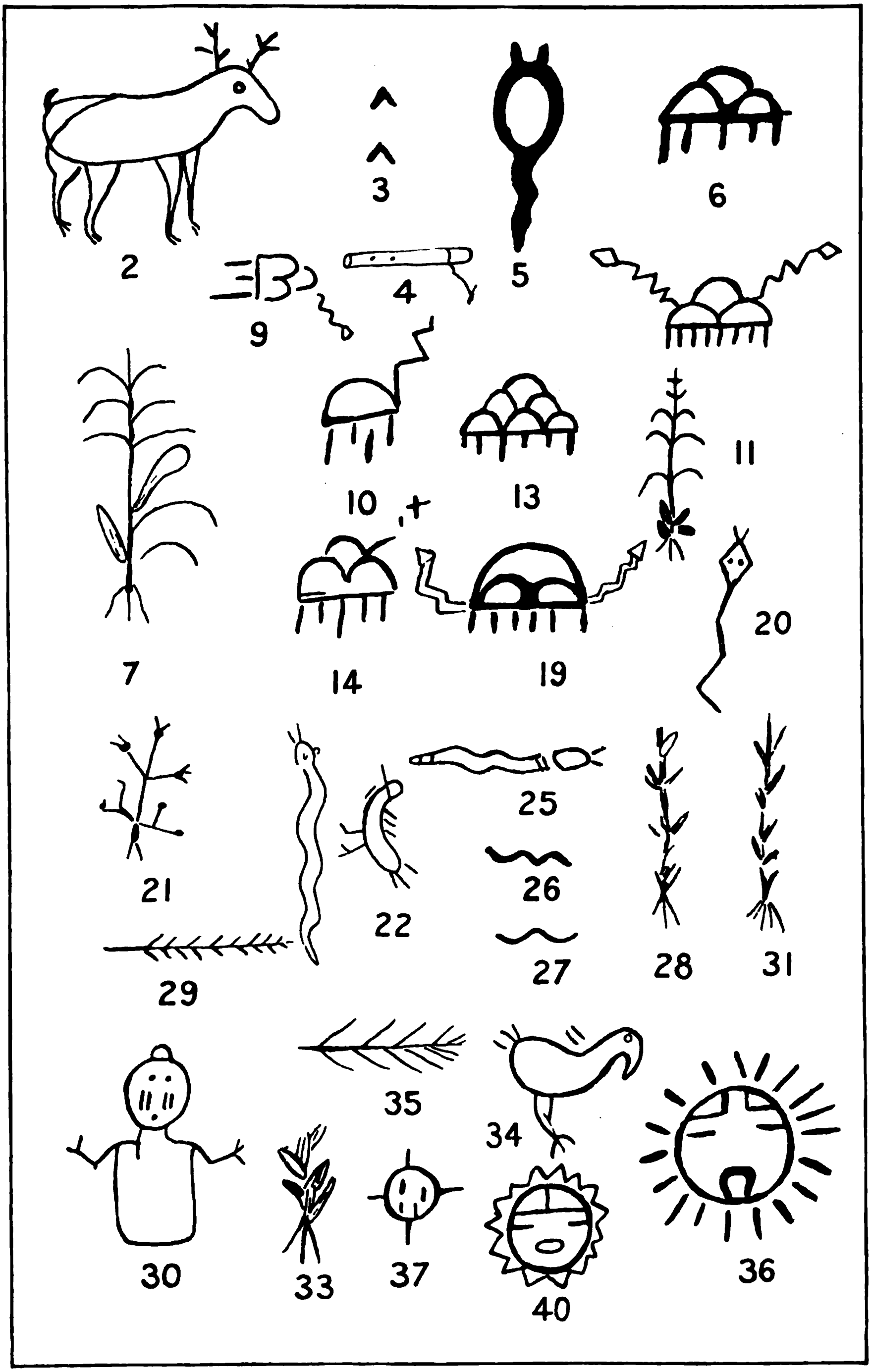
[1] Formerly used to support bundles on the back and worn over the forehead.



HOPI TOTEMIC SIGNATURES

73. Intiwa (Walpi).
    Katcina gens; totem, mask of Hehea (a katcina). Chief of the Katcinas.
74. Sikyahoüava (Micoñinovi).
    Katcina gens; totem, mask of katcina.
75. Macahoüava (Oraibi).
    Katcina gens; totem, mask of Tacab (Navaho) katcina.
76. Simol̆tiva.
    Katcina gens; totem, mask of Ahole (a katcina).
77. Kwavioma (Micoñinovi).
    Gyazro (Parrot) gens; totem, parrot.[1]
78. Kami.
    Gyazro gens; totem, parrot.
79. Kütcventiwa (Micoñinovi).
    Salab gens; totem, plant (salab).
80. Cinainiwa (Cuñopavi).
    Katcina gens; totem, mask of Tatcükti (Mud-head).

Asa (Tansy mustard)

81. Nahü (Sitcomovi).
    Tcakwaina gens; totem, mask of Tcakwaina (a katcina).
82. Nüvati (Sitcomovi).
    Tcakwaina gens; totem, rabbit-stick or boomerang.[2]
83. Süyüku (Walpi).
    Tcakwaina gens; totem, mask of a katcina.
84. Syunoitiwa (Walpi).
    Tcakwaina gens; totem, mask of a katcina.

The Tcakwainyumŭ or Asa people formerly lived near Abiquiu, at a place called by the Hopi Kaekibi. They traveled with the ancestors of the Hano people westward as far as Laguna, where they separated, the Asa group going westward by way of Zuñi. Some of their number remained at this pueblo, where their descendants still live, and are called by the Zuñis the Aiyohokwi. The remainder pushed on to Tusayan and settled near Coyote spring, at the East mesa. They fought with the Yutamŭ (Utes), who were harrying the Hopi, and drove them out of Tusayan.

During a period of famine the Asa people moved from the East mesa to Tubka (Tségi, Canyon du Chelly), where they lived some time and planted peach trees.[3] They intermarried with the Navaho while there and forgot their native speech, Tanoan, and spoke Navaho. They returned to Walpi about 1750, and probably passed through Zuñi between 1700–1710.

---

[1] Possibly paroquet or macaw; a frequent pictograph in the country south of Tusayan, and well represented on prehistoric pottery from that region.

[2] Wacri's totemic signature of the pŭtckohu (rabbit stick) has a better form.

[3] It will thus appear that the ruined pueblos of the Canyon Tségi were inhabited in recent times. I believe they were inhabited in the middle of the eighteenth century.

It would not be strange to find totem signatures of the Asa people, in the form of pictographs, in suitable places along the trail of their migration.

Piba (*Tobacco*)

85. Nakwayĕctiwa (Oraibi).
    Piba gens; totem, tobacco flower.
86. Talasyamtiwa (Oraibi).
    Piba gens; totem, tobacco flower.
87. Hani (Walpi).
    Piba gens; totem, tobacco flower.

Honani (*Badger*)

88. Maciumptiwa (Sitcomovi).
    Honani gens; totem, badger's paw.
89. Cakwünü (Oraibi).
    Honani gens; totem, badger's paw.
90. Yoyowaiya (Sitcomovi).
    Honani gens; totem, badger with bundle of medicine on back,[1] purification feather in forepaw.
91. Kwumahoiniwa (Oraibi).
    Honani gens; totem, badger's paw.[2]
92. Ponyamüiniwa (Oraibi).
    Honani gens; totem, badger's paw.
93. Nüvayauma (Walpi).
    Honani gens; totem, badger's paw.
94. Kwatcakwa (Walpi).
    Honani gens; totem, badger's paw.
95. Koyoñainiwa (Sitcomovi).
    Honani gens; totem, badger's paw.
96. Tünima (Sitcomovi).
    Honani gens; totem, badger's paw.
97. Siima (Oraibi) (obiit, 1895).
    Honani gens; totem, badger's paw. Chief of Katcina priesthood.

Atoko (*Crane, Heron*)

98. Tuwahoiniwa (Oraibi).
    Atoko gens; totem, crane, heron.
99. Sakwacina (Oraibi).
    Atoko gens; totem, bird.

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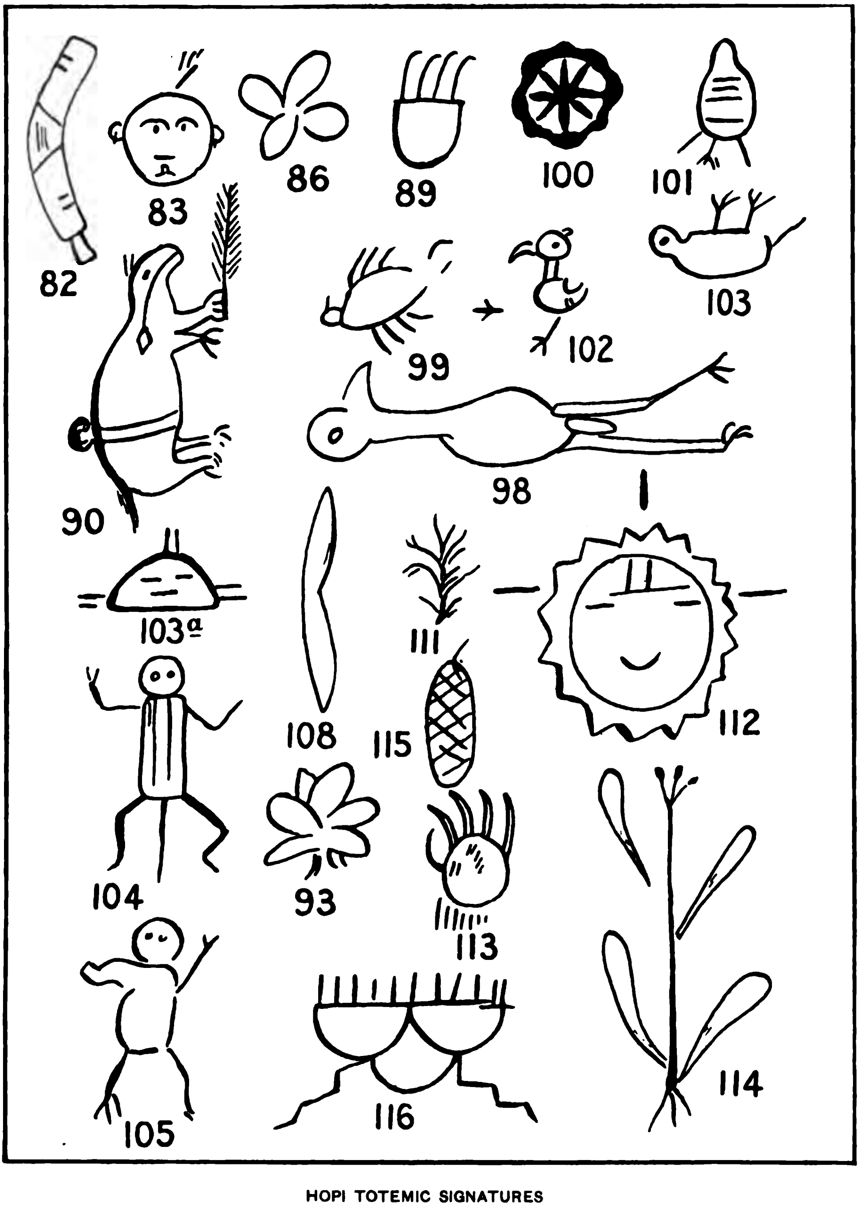
[1] The Katcina cult is intimately associated with Badger clans.

[2] Moñwi makes the best signature of badger's paw. His totem occurs on many of my subvouchers.



HOPI TOTEMIC SIGNATURES

Patuñci (*Squash flower*)

100. Talasnumtiwa.
    Patuña (Squash) gens; totem, squash flower.
101. Talasyauma (Micoñinovi).
    Patuña gens; totem, squash.

Kele (*Pigeon-hawk*)

102. Talasventiwa (Oraibi).
    Totem, bird.

Kala (*gopher*)

103. Paluñauûh (Cipaulovi).
    Totem, gopher.
103*a*. Humiñül̃tiwa.
    Totem ?

Patcibkwaca (*Lizard*)

104. Wikvaiya (Oraibi).
    Lizard gens; totem, matcakwa (horn-toad).
105. Nawini (Oraibi).
    Horn-toad gens; totem, horned toad.
106. Tawakwaptiwa (Oraibi).
    Piyüküe (Bearskin Robe) gens; totem, bearskin robe.

Awata (*Bow*)

107. Lomanimtiwa (Oraibi).
    Awata gens; totem, bow.
108. Nücitima (Oraibi).
    Awata gens; totem, bow.

Teve (*Greasewood*)

109. Boliyectiwa (Oraibi).
    Teve gens; totem, bush of teve.
110. Lomankwa (Oraibi).
    Teve gens; totem, bush of teve.
111. Cikaiyectiwa (Oraibi).[1]
    Tebe gens; totem, bush of tebe.

HANO SIGNATURES

Tañ (*Sun*)

112. Kalacai (obiit, 1893); totem, sun's disk. Chief of Sun priesthood.

Ke (*Bear*)

113. Motco; totem, bear's paw.

---

[1] The signatures from 107–111 include gentes extinct on the East mesa. Clans 107 and 108 existed at Awatobi and may have been derived from that fated pueblo.

Sa (*Tobacco*)

114. Anoti; totem, plant (tobacco).

Kulon (*Corn*)

115. Polakaka; totem, ear of corn.

Okuwa (*Rain-cloud*)

116. Kwalakwa; totem, rain-cloud. Chief of Sun priesthood.

The trail of migration of the ancestors of the Hano people was from Tewagi, in the Rio Grande country, to Laguna; thence to sites of Fort Wingate, Fort Defiance, Pueblo, Colorado, and Keams Canyon. They arrived in Tusayan about the beginning of the eighteenth century.

I have introduced on the accompanying plates the typical totemic signatures referred to in the preceding pages. The figures under the signatures correspond with the list of names, but I have the totems of each of the 116 names mentioned above, and believe no important gens has been overlooked.

In studying Mr Hodge's valuable article[1] on the Pueblo clans, I am struck with the large number of gentes in Tusayan as compared with the Rio Grande pueblos. The very small number at Zuñi, which is said to have four-fifths as many people as all the Hopi towns, is not only exceptional as compared with Tusayan, but also in comparison with the Rio Grande pueblos. It would not surprise me if the number of clans reported from Zuñi is too small. The Zuñis, like the Hopis, are a composite people, the original nucleus of which has assimilated increments from many pueblos now in ruins or still inhabited. While these additions may have been adopted into existing clans and thus lost their identity, in some cases, as the Asa, and presumably in others, this was not the case.

There has always been a tendency for the inhabitants of one pueblo to seek a home in another and there to marry. This holds also for families, and within my memory a Zuñi, his sister, wife, and children have become domiciled in Walpi. Hopis born in Tusayan are found in many southwestern pueblos. In ancient times refugees or colonists from pueblos now in ruins did the same, even when they sought an asylum among a people of different speech. The result of this commingling has made a people of close consanguinity, although linguistically different; but it was a composite people before it settled in the pueblos which its descendants now occupy. No one has yet shown where this culture originated, although we think we can trace the northern, eastern, and western frontiers. We know, however, that a similar culture once existed in the northern states of Mexico, and have not yet traced its southern boundaries where it merges into the culture of the south.

---

[1] American Anthropologist, vol. IX, No. 10.

THE VATICAN MANUSCRIPT No. 3773.—Among the more interesting of the numerous Nahua pictorial manuscripts published in Lord Kingsborough's great collection is that known as the Codex Vaticanus, No. 3773. This manuscript, which was placed in the library of the Vatican at least as early as 1596, is generally believed to refer to native rites or ceremonies arranged in calendar form. It consists of nine pieces of tanned deerskin, 31½ palms in length, comprising 48 leaves partly painted, which, together with the last leaf (which should be numbered 49), are attached to a wooden cover; inside of this cover the leaves are folded in the form of a screen, making an *amoxtontli* or "small book," eight inches high, seven inches wide, and three inches thick. The paper of this beautiful little product of Mexican art is made of the leaves of the agave plant. The artist Aglio, whom Kingsborough employed to copy the work for publication, was misled by one of the covers into beginning his copy at the end of the codex and to finish it at the commencement, for he noticed that one of the covers has attached to it two labels in European writing, which he surmised marked the beginning of the book. Its location in Kingsborough is at the end of the third volume of the "Antiquities of Mexico," London, 1831–'48 (nine volumes, grand folio). To remedy this lamentable mistake, His Excellency, the Duke of Loubat, sought permission from Pope Leo XIII to reproduce the valuable relic in a new facsimile edition, which should be an absolutely perfect reproduction of the original in design and color. The publishing firm of Danesi, in Rome, acceptably acquitted itself of the task and thereby earned the applause of all antiquaries. Only fifty copies have been printed and distributed to the favored few able to appreciate this unique document; they are each accompanied by three explanatory treatises matching in size the codex itself, one in English, one in Spanish, and the third in Italian.

One who had not previously seen a Mexican manuscript would, when first inspecting this volume, naturally believe it to be a picture book for small children. The gaudy colors, the strange acts in which the persons figured are engaged, their curious accouterments bedecked with ornaments, the grotesque and impossible animals assembled on almost every page, sometimes serving as sacrificial victims, afford a sight "fearful and wonderful to behold." A closer comparative study, however, soon reveals the fact that the drawings are of a symbolic nature and that every picture has a meaning disclosable by profound study of the Nahua people, their customs and artistic development. Just as in the rites and ceremonies of the Christian church everything is symbolic, so here the red body-paint of the "heroes" differs in meaning from the black or brown daubings across the face. The numerous ornaments on their heads, garments, and legs all have a distinct meaning, as each color has its special significance. Colors are not grouped discordantly, but always leave a pleasing effect on our visual organs, although the aboriginal artist was entirely unacquainted with what we call perspective. Every student of Indian picture-writing will appreciate the excellent work the Duke of Loubat has so generously performed.

A. S. GATSCHET.

DR D. G. BRINTON will deliver a course of six lectures on "The Religions of Primitive Peoples," at New York University, on successive Tuesday evenings, beginning January 12, under the auspices of the American Committee for Lectures on the History of Religions. The lectures will later be published in book form.

DAKOTA INDIAN CATECHISM.—Mrs C. H. Smith and Rev. William J. Cleveland have just published at Madison, S. D., a translation into the Dakota language of "The Church Catechism simplified by Short Questions and Answers, together with Illustrations intended for the Younger Children of the Church."

TELL ET-TIN ON LAKE HOMS, IN THE VALLEY OF THE ORONTES[1]

I. M. CASANOWICZ

M. Gautier undertook his explorations in the valley of the Orontes in the spring of 1894 and continued them for more than four months. His object was to identify the site of Kadesh, the ancient capital of the Hittites. The two tumuli, Tell et-Tin and Tell Nebi Mende, seemed alone to agree with the data on Kadesh given in the poem of Pentaur and the pictorial representations in the temples of Luxor and Ipsambul, which celebrate among other deeds of Ramses II his victory over the Hittites at Kadesh (about 1300 B. C.). M. Gautier, for several reasons, confined his operations to Tell et-Tin, and though he did not attain his main object, the discovery of the site of Kadesh, as it is well established that the capital of the Hittites was situated near Tell Nebi Mende, the other results of his researches are of much geographical and anthropological interest.

Tell et-Tin is an island on the lake of Homs. The latter is really a pool formed by an old dam which cuts through the river Orontes ten kilometers east of the city of Homs (the ancient Emesa). The island is oval-shaped, measuring 300 by 200 meters; on the west side it plunges abruptly into the lake, while its eastern part is a low and swampy plateau. Upon this plateau M. Gautier set up his camp and attacked the tumulus on its east side, as the violent winds which blow from the west forbade any operations on the west or north front.

In the course of his excavations M. Gautier was able to distinguish in the present composition of the tumulus several layers marking different historical periods. The summit of the mound, comprising a right angle of 40 by 20 meters, contained the debris of fortified military posts which M. Gautier ascribes either to the Crusaders or to the period of the struggles between the Mohammedan princes who had converted this part of Syria into a vast battle-field. The surface of the mound consisted of a thin stratum which might be referred to the Byzantine and Roman periods, for among the bronze medals found in it was one with the portrait of the Emperor Claudius. At that time no edifice of importance seems to have existed on the island. Four and a half meters beneath the summit he came across the foundations of a wall which was constructed of chalky limestone blocks measuring 1.10 meters by 55 centimeters. One meter below this a layer of beton indicated the platform of a citadel which once surmounted the mound. This M. Gautier credits to Greek civilization; for in this same stratum were found fragments of pottery made of fine paste, carefully polished, which had assumed a beautiful red vermilion hue; among them the handle of an amphora which bore the impress of a seal in the shape of a heart and was inscribed with two Greek words. There were also found there styli and spatulæ of bone, lamps, and terra-cotta figurines. At a distance of six and a half meters from the summit the layer presented quite a different aspect. It consisted of a mass of unburned bricks and large undressed basalt stones, mingled with the debris of charred wood. M. Gautier is inclined to see in this layer the ruins of a large town settled by a Phœnician colony. Descending the summit and crossing the wall which runs around at a short distance from the present crest of the mound, we are suddenly transferred from Greek and Phœnician civilization to the primitive Bronze age, as evinced by the objects found in the graves with which the flanks of the tumulus outside the wall are strewn. The gap between the two, M. Gautier thinks, may be filled out with the Hittite occupation of the island. It is perhaps worth noticing that, notwithstanding the excavations were carried to a depth equal to the level of the lake, nowhere was virgin soil reached except at one point in the southern part of the tumulus. Thus far the topographical features of Tell et-Tin.

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[1] Abstract from *Note sur les fouilles enterprises dans la haute vallée de l'Oronte pour retrouver l'emplacement de l'ancienne ville de Kadech. Extrait des comptes rendus de l'Académie des Inscriptions et Belles-Lettres;* by M. J. E. Gautier. Paris. 1895.

Of special interest, from an anthropological standpoint, are the objects found by M. Gautier in the tombs mentioned above, which are now at the Imperial Ottoman Museum in Constantinople.

The funerary chambers ran in the direction from east to west. Some of them contained only one corpse, but in most of them several skeletons were found. The corpses were encased in an oval-shaped coffin of fine pottery clay (not unlike those found at Warka), head toward the east and the legs drawn up toward the breast, so as to occupy as little space as possible. Beside each body, usually near the head, were placed two small earthen vases, one with a narrow neck, the other with a wider opening.

The layer above the sepulchres contained the debris of charcoal mingled with bones of oxen and sheep, evidently the remnants of a funerary sacrifice and repast. In this layer were embedded pottery, similar in form to that found in the clay coffins, and various bronze weapons. Among these the ax predominated. It was small, light, with a rounded edge and provided with a socket for the reception of a wooden handle. In the center, on both sides of the convex midrib, were oval-shaped holes cutting into the socket so as to permit the weapon to be fastened by thongs to its handle. Less frequent was the occurrence of small blades of lances, which were likewise provided with sockets. Still more rare were poniards of large size, which instead of a socket had three nails on the blade tongue for attachment to the wooden handle, thus seeming to date from a more primitive age than the arms described above, as the appearance of the socket indicates a more advanced stage of civilization.

Beside each skeleton were found pins of a peculiar type. They were about twenty centimeters in length, the head decorated with a fluting, with a ring passed through a hole at about six centimeters from the head.

Pieces of bronze plaques, strongly oxidized and apparently remnants of shields, were also found in the graves.

Fragments of necklaces composed of carnelian beads, not unlike those found in the necropoles of Egypt, were mingled with the bones. Occasionally there were also met beads of enameled paste and of rock crystal. Some of the tombs contained alabaster ornaments in the form of a crescent, with an opening of about twenty centimeters, and a small peduncle in the middle of the arch.

Silver was represented by some fragments of bracelets, but no trace of iron was discovered.

In one tomb, which contained more than twenty corpses, an Egyptian seal of enameled paste was found It was oval in shape, pierced by an oblong hole, and inscribed with hieroglyphic characters.

Underneath these layers, with remnants of the bronze epoch and reaching down to the water-level, was collected a quantity of cutlery of silex in the form of blade fragments. Some of these prehistoric arms were of smoked rock crystal.

From the fact that bronze implements make their appearance abruptly, without the indication of other changes in the social life and without a marked line of separation from those of the stone age, M. Gautier concludes that the same race inhabited the site of Tell et-Tin at these different epochs, and that it learned the use of bronze all at once from the peoples of the Caucasus, who were more advanced in civilization and with whom it had commercial relations.

AMERICAN ASSOCIATION.—An informal conference of the members of Section H of the American Association for the Advancement of Science was held in Hamilton hall, Columbia University, New York, December 30. Miss Fletcher presided and about a score of members of the section took part in the proceedings. The chief purpose of the conference was to discuss the scope of anthropology and to consider the desirability of obtaining authority from the Association for the holding of winter meetings of the section. It was the general opinion that semiannual meetings of the section would be useful to the anthropologists of the country and would tend to strengthen the Association, and steps were taken toward the establishment of a series of winter meetings, to be held in different cities. A number of communications on the scope of anthropology and on recent work in the science were presented and discussed.

MAJOR J. W. POWELL, Director of the Bureau of American Ethnology, is delivering a course of six lectures in Columbian University. These lectures embrace the results of recent researches not yet printed. The titles are: (1) The Science of Anthropology Defined and Characterized; (2) The Science of Demonomy Defined and Characterized; (3) Savagery Defined and Characterized; (4) Barbarism Defined and Characterized; (5) Primitive Civilization Defined and Characterized; (6) Modern Civilization Defined and Choracterized.

SCARRED SKULLS FROM FLORIDA

FRANK HAMILTON CUSHING

While conducting last winter (in the interest of the Bureau of American Ethnology and of the University of Pennsylvania) the excavation of Safford and other burial mounds near Tarpon springs, western Florida, I unearthed the skeletal remains of more than six hundred individuals. Of the better preserved skulls of adults among these remains, about nine in fifty were of special interest as exhibiting crest-ridges; that is, on each, extending from the frontal apex backwardly and divergingly along either side of the coronal and to the parietal regions, was a slight but very marked and regular ridge formed by a papuloid growth of bone, which seemed to have resulted from the cicatrization of the scalp, caused by the shaving or the removal otherwise of hair from the sides of the head and by the singeing or cauterization of the scalp along the lines indicated, so as, by preventing growth, to sharply define the lateral boundaries of the hairy crests thus left.

Now, it is a well-known fact that certain classes of men among the southern tribes—notably those of the Maskokean confederacy, the Creeks, especially—wore the hair in erect crests, cropped and narrow in front, broadening rearwardly to the back of the head, where it was allowed to grow to the normal length, and whence it depended in each case, either naturally like a tail, or bound about with fur or stuffs to form the so-called scalp-lock. The researches of Gatschet make it evident that this was the special hair-dress of the warrior class (see portrait of Tomochichi, a Yamasee war-chief, in Urlsperger, vol. I). He finds that in the Creek language tás-sa (Hichiti Tás-si) signifies alike "jay or kingfisher" ("crested bird") and "hair-crest," while Tas-si ka-ya signifies "warrior" (lit., "crest standing up"—that is, "he of the erectile crest"). From other sources it appears that as the jay was regarded more powerful in resisting even birds of prey than were any other birds of his kind, as was also the kingfisher, so nearly resembling him—more powerful than other birds of his kind, because of their shrill and startling cries and their habits of erecting (when alarmed in defending or wrathful in offending) their hair-like crests. Wherefore the crest of the jay and of the male kingfisher, and even of the martin, came to be imitated (reproduced, so far as possible) in the head-dress (or aspect) of the warrior—the wrathful defender of his people and their homes.

The significance of this primitive tendency to liken the man either to his totem or to the animal whose distinguishing traits and (supposedly) corresponding functions were essential to the office held by the man is singularly illustrated, not only by the animistically and otherwise painted human masks of the collections which we later gathered, but also by certain other skulls in this same collection, in which such resemblances and their (supposedly) associated potencies were sought to be effected by actual distortions of the cranium itself; as in the case of one skull artificially flattened and broadened in the frontal and coronal regions, evidently in order to heighten its resemblance to the characteristic form of the head of the mountain lion or puma, since it was found associated with the fragments of a sacrificial bowl on which the symbols of the puma were prominently and dually depicted. With this evidence in mind, it was not difficult to infer, and measurably to ascertain, that other artificially deformed skulls in the collections had been given their characteristic shapes to liken them to and thereby to confer upon their possessors the powers and relationships of, totemic or other animals; as, for example, of the snake and the tortoise especially—and it would seem that this helps us to a fairly clear understanding of the significance of the real object in primitive skull distortion the world over, namely, that such distortions (and other like mutilations of person) were designed not so much as tests of pain—evidences of endurance on the part of the warrior or other candidate—as to confer through actual physical resemblance actual ideally conceived animal powers.

PUEBLO ARCHITECTURE.—*The American Architect*, published at Boston, announces the publication during the year of a series of illustrated articles, by Cosmos Mindeleff, on "Pueblo Architecture." Mr Mindeleff's memoir on the "Cliff Dwellings of Canyon de Chelly, Arizona," will be published by the Bureau of American Ethnology in the course of a few months.

BOOK REVIEW

The Principles of Sociology: An Analysis of the Phenomena of Association and of Social Organization. By Franklin Henry Giddings, M. A. New York and London, Macmillan and Company, 1896. Pp. i–xvi, 1–476.

"The time has not come for an exhaustive treatise on sociology. Nevertheless the scientific description of society is well advanced, and there is no reason why it should remain inarticulate." So opens the preface to this pioneer treatise; and on the foundation thus outlined the superstructure of the work is erected in accordance with the designs of the economist rather than those of the general anthropologist, yet in such manner as fairly to accommodate both classes of tenants. It is a model of systematic arrangement, the quadripartite symmetry being the more noteworthy because much of the material has been used before in different connections. There are four "books," each divided into four chapters, and the work ends with a classified bibliography occupying twenty pages, and an admirable index.

The first "book" is "The Elements of Social Theory." The initial chapter recounts the gradual development of the sociologic idea—the slow and halting recognition on the part of certain students that there is need for a science whose unit is not the individual but the group; and this science is clearly discriminated by Professor Giddings and, after Auguste Comte, denominated *sociology*. Perceiving (like other students) that while this science of the collective is fundamentally and essentially distinct from all other sciences it is nevertheless difficult to formulate its fundamental characters, Professor Giddings then seeks the primary sociologic postulate and concludes that "The original and elementary subjective fact in society is *the consciousness of kind*" (page 17), the context and other references indicating that the formula might be more exactly written *the cognition of our* (or *my*) *kind.*

Passing in the second chapter to the province of sociology, Professor Giddings is led to a classification of the sciences in such terms as to define the position of the collective science. The essential and admirable feature of this classification is recognition of the fact that any science may be either concrete or abstract, according to the aspect in which it is viewed. "It is therefore more accurate to class a science as abstract if it is concerned chiefly with relations, properties, or forces and only incidentally with aggregates. * * * A science is concrete if its chief aim is to explain aggregates as such, though it deals also with properties and forces and uses the methods of abstraction. * * * Thus instead of one linear series of sciences there are two distinct orders of sciences, so related to each other as to make cross-classifications in every part of the intricate domain of knowledge" (page 48). Accordingly the "domain of knowledge" is grouped in horizontal zones, corresponding to objects-matter, comprising chemistry, astronomy, geology, biology, psychology, and sociology, and the several zones are divided into vertical columns defined by subjects-matter or methods, including mathematics, physics, economics, ethics, and politics. Through this arrangement it is shown graphically that the closest affiliations of sociology are with psychology, and that in their descriptive aspect both presuppose the concrete physical sciences, while on their explanatory side they are mathematical, physical, economical, and ethical, every one of the abstract sciences contributing "principles of interpretation to concrete psychology and concrete sociology" (page 50). In the third chapter the methods of sociology are set forth as observation and description, accompanied by retrospection and history, followed by explanation, generalization, and verification; the methods being precisely those in use in other branches of science dealing with simpler objects-matter. Then the problems of sociology are shown (in chapter iv) to be in part primary and in part secondary, the primary problems including those of (1) aggregation, (2) association and coöperation, (3) social characteristics, and (4) social classes, while the secondary problems relate to process, law, and cause.

The second "book" deals with "The Elements and Structure of Society," and comprises chapters on the social population, the social mind, the social composition, and the social constitution. Beginning with gregarious mammals, birds, and insects, and rising into human tribes and nations, it is shown that the grouping of organisms, which gives basis to the science of the collective, ranges from simple aggregation to definite association in which the grouping is purposive and designed for the common good, and also that "association reacts upon the associating individuals and modifies their natures" (page 121) in such manner as to develop collective characteristics—*i. e.*, characteristics which isolated individuals could neither acquire nor retain. The fifty-three pages of chapter I in this "book" are too rich and suggestive for condensation. This part of the treatise alone would suffice to establish the elements of the science which Professor Giddings undertakes to expound, since it sets forth clearly not only the development of collective relations, but the genesis of collective characteristics. A single collective character may be specially noted, partly by way of illustration: It is shown that a prime requisite in aggregation as well as in association is mutual tolerance, which is the germ of justice, and that it is only through *toleration* that coöperation and alliance become possible. Several of the almost innumerable consequences of this principle are developed. Passing to the consideration of the social mind, the author sets forth the essentially collective features of mentality, including self-consciousness, sense of justice, and belief. Next it is shown that the social composition comprises units of widely diverse orders of magnitude, the most important of which are the family, the ethnic (or kindred) group, and the demotic group, in which the altruism of humanity rises above the egoism of consanguinity. Under the social constitution, forms of organization are discussed in respect to genesis, as well as in their static aspects, and incidentally it is shown that "the analogy of the social constitution to the constitution of a biotic organism is real" (page 194), the organization, like the organism, being the product of interaction between hereditary characters and environmental conditions.

In the third "book" "The Historical Evolution of Society" is traced after the manner of biotic phylogeny. Beginning with zoögenic association, which is adaptive rather than purposive, it is shown that among gregarious (and indeed among most other) animals the collective characters growing out of association may be either beneficial or injurious to the species, and thus enter the domain of natural selection in which the beneficent among characters are preserved while the maleficent are destroyed, and it is intimated (and might well be more strongly emphasized) that the effect of interaction between individual organisms and collective characters is cumulative, tending ever toward the development of common features and thus toward altruism and solidarity. Passing, then, to anthropogenic association (chapter II), Professor

Giddings discusses the effects of continuity in society and the genesis of human nature, and proceeds to a speculation concerning the origin of races and more specific consideration of the growth of economic, juridical, political, esthetic, and religious ideas, and the concomitant development of the human mind in contradistinction from the animal mind of the zoögenic stage, the chapter being a notably suggestive exposition of the relatively simple and direct processes by which the relatively complex social structure has been produced. In the succeeding chapter on ethnogenic association these processes are considered with reference to the family, clan, and tribe, and under demogenic association (chapter IV) they are extended to the multifarious groups and institutions of civilized nations.

The fourth "book" is devoted to consideration of "Social Process, Law, and Cause." In the first chapter the social process is treated from the physical, and in the second from the psychical standpoint; and it is shown that the agencies and conditions of social development are in every respect comparable or identical with those characteristic of the mineral, vegetal, and animal worlds, save for the fundamental distinction in unit—the individual in other sciences, the group in the science of the collective. The plain and straightforward common sense of these chapters cannot fail to delight those readers who appreciate this quality of human understanding. In the succeeding chapter social law and cause are treated in accordance with the methods pursued in the third "book," and the treatise closes with a chapter on the nature and end of society, in which the analogy between organisms and organizations is reiterated and amplified.

Taken as a whole, the treatise is noteworthy for originality and strong individuality, no less than for the fact that it enters a comparatively virgin field lying between the provinces of pure anthropology and applied anthropology. The author pushes out from the latter province, and though gratifyingly successful in grasping the methods pursued in the former, sometimes betrays unfamiliarity with its cultivators and the fruits of their labors—*e. g.*, he quotes from early records of superficial observation to invalidate conclusions of the most experienced scientific student of the American Indians now living (page 163), and throughout misspells the name of a leading anthropologist, though an associate of his own in the university whence the work practically emanates! Thus the volume, especially in the second and third "books," has an empiric rather than a scientific air, which is measurably misleading, since the exact statement, the excellent arrangement, the sensible and straightforward treatment, and above all the definite recognition of the basis of the science of the collective, give it decided scientific value.

To the reviewer the classification and nomenclature expressed in the arrangement and titles seem hardly happy. Among many students of anthropology the term sociology has come into use as a designation for the science of institutions, and is thus made coördinate with somatology, pyschology, linguistics, technology, and mythology (or sophiology), while some students use the term demology (or demonomy) to designate, in its various aspects, the vast science whose units are organizations, small or great, akin or alien, adaptive or purposive; and in accordance with this usage it would seem desirable either to limit somewhat the scope of the work to fit its title, or to enlarge the scope under a broader title. This suggestion need not be developed; it suffices to note that the elaborate and in many respects excellent nomenclature of the author will probably be found to require revision as the time for "an exhaustive treatise on sociology" approaches.

Again, it would seem to the reviewer that Professor Giddings' formula for the science of the collective (*consciousness of kind*) is hardly suitable as a basis either for the science of institutions or for the science of organizations; for the former it is too narrow, since institutions are essentially purposive and beneficent, and for the latter it is much too general, since organization is at the outset largely or wholly adaptive, antedating consciousness or even cognition as these terms are ordinarily employed. Thus *consciousness of kind* implies the classific faculty, and even *cognition of* (*our*) *kind* implies self-consciousness, apperception, discrimination, coördination, and other mental processes of considerable complexity and advanced development, so that the formula is inapplicable to phytogenic and zoögenic association, as well as to the lower stages of anthropogenic union. Again, it has been shown[1] that the plants of desert regions gather in communities, where they are joined by animals, so that the life of the desert is communal and in some measure commensal, to the common benefit of the participants; it might be shown that the horse and other domestic animals have lost their original characters so completely that their intelligence is but a reflection of the human mind, while their fealty to man is stronger than kinship bond; and in these and many other cases it is manifest that the basis of organization must be, among part or all of the participants, purely adaptive and independent of intelligent recognition either of *our* kind or of kind in general. As Professor Giddings justly urges, a formula for demotic science is greatly needed; but the reviewer is disposed to question whether the essentially distinct (and to most people elusive) idea of the collective unit can be expressed in terms which were adopted and are habitually used to convey knowledge concerning individual units; for although the methods are similar, the intellectual chasm separating demology from all of the other sciences is many times broader and more profound than the break between any other two sciences. The fundamental process distinguishing demology throughout its entire range would seem to the reviewer one of inter-adjustment, either passive or active, either spontaneous or enforced, and either adaptive or purposive, between two or more individuals, the adjustment being of such character as to combine the individuals in systems. Since there is no term in any language known to him to express its essential idea, he is tempted to stamp the process *conjustment*. It is confidently opined that the use of some such term, with a clear definition, will tend to elucidate and establish the elements of the science foreshadowed by Plato and Aristotle, conceived by Comte, nurtured by Spencer and Ward, and rendered articulate by Giddings.

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[1] "The Beginning of Agriculture," American Anthropologist, vol. VIII, October, 1895, p. 350 *et seq.*

The work has been favorably noticed elsewhere, notably by Patten (in *Science*, new series, volume III, 1896, pages 709–711), who suggests that the attributes of social beings, presumptively of the higher orders, be combined under the term *socialry;* Ward has reviewed it extensively and critically (especially in *Annals of the American Academy*, volume VIII, 1896, pages 1-31); while Spencer (*Popular Science Monthly*, volume L, 1896, pages 163–171) has pointed out that some of his ideas have been adopted by Professor Giddings without adequate recognition of their source.

W J McGee.

HORATIO HALE

The death of Mr Horatio Hale occurred on December 28, 1896. He was in his eightieth year, his birth having been on May 3, 1817, at Newport, New Hampshire.

While still a student at Harvard College he became interested in American aboriginal languages, and collected a vocabulary of an Algonquian dialect, which was printed in 1834. This effort, together with his progress in allied studies, led to his appointment as linguist and ethnographer on the "United States Exploring Expedition" which circumnavigated the globe between 1837 and 1842. He was active in collecting materials. and in 1846 the volume containing his results appeared and was at once acknowledged to be one of the most valuable works of the kind then known. It was highly complimented by such authorities as Latham, Max Müller, and others, and it still ranks as indispensable to one who would acquaint himself with Polynesian and American ethnography, the two fields in which it is the strongest.

For ten years after its publication Mr Hale occupied himself with his profession, the law, and finally settled in Clinton, Canada, where he married and passed the remainder of his life. Though remote from the centers of thought and education, he constantly maintained his interest in the sciences of his preference, and contributed a number of papers to them.

For many years the origin and distribution of languages and linguistic stocks attracted his attention. He studied closely the occurrence of "child-languages," such as are developed independently by some children, and brought forward cogent arguments from them to explain the rise of linguistic families. He also emphasized the importance of languages as measures of ethnic capacity and as criteria for the classification of human groups. In these directions he always displayed a thorough appreciation of the purely human in man and the value of psychic standards.

Apart from his extensive collections in American tongues, his special work was on the Iroquois dialects. He edited, with a valuable introduction, the *Iroquois Book of Rites*, an important native text descriptive of their mortuary ceremonies and opinions of the after-life. While investigating in this field he made the memorable discovery that the Tutelo of Virginia belonged to the Siouan family, a fact which has been amply supplemented since by the researches of Dorsey and Mooney. His early collections on the northwest coast led to the appointment by the British Association of a committee who should expend annually a certain sum in further exploration in that rich field, and the reports by Dr Franz Boas and others, which were the result of the committee's efforts, rank among the most thorough contributions to American linguistics. They were justly considered of such merit that on several occasions the Canadian Parliament supplemented the grants of the committee by considerable sums.

Mr Hale was vice-president of the American Association for the Advancement of Science at Buffalo in 1886 and chairman of its Anthropological section. He was also at one time president of the American Folk-lore Society, and at his decease was honorary or corresponding member of numerous learned bodies. In 1893 he contributed to the proceedings of the International Congress of Anthropology a paper on *The Fall of Hochelaga*, in which he showed that in 1553, when Cartier ascended the St Lawrence, its shores were in possession of the Huron-Iroquois; but when, about half a century later, Champlain extended his voyage up the river, it had passed into the domain of the Algonkins. He explained satisfactorily this curious historic fact.

With similar acuteness he set forth in his earlier writings the direction and approximate dates of the prehistoric migrations of the Polynesians. By means of a close comparison of arts, dialects, and traditions he was enabled to map out the journeys of the first settlers of the Pacific isles with such accuracy that later investigators have generally accepted the main lines of his theory.

In all his writings Mr Hale was singularly fair and courteous to his contemporaries. He loved science for its own sake, and sought to avoid controversies, and when, as occasionally happened, he was drawn into one, the moderation of his tone offered a model for his antagonist.

Outside of his scientific acquirements, he was of broad education, loving literature and aiding in general education as opportunity offered. In personal intercourse he was ever kindly and considerate and ready to aid the student freely from the abundant resources of his own knowledge.

D. G. BRINTON.

A NEW MONTHLY.—The initial number of the *Antiquarian* has made its appearance at Columbus, Ohio, under the editorship of Dr J. F. Snyder, of Virginia, Illinois; Dr Clarence Loveberry, of Columbus, and Mr Harlan I. Smith, of New York. The leading articles are reprinted from other sources, which seems rather unpromising for the journal, when a practically limitless quantity of new material relating to American antiquities may be had for the asking. However, the announcement for the forthcoming issue affords assurance of the usefulness of the magazine. If for no other reason than that confusion is likely to arise between the *Antiquarian* and Dr Peet's long-published *American Antiquarian*, it is regretted that the editors and publishers did not launch their enterprise on its own merit by adopting a new name.

F. W. H.

FOLK-LORE SOCIETY.—The following officers for 1897 were elected at the recent annual meeting of the American Folk-lore Society, held at Columbia University, New York: President, Mr Stewart Culin, of Philadelphia; First Vice-President, Professor Henry Wood, of Baltimore; Second Vice-President, Dr Franz Boas, of New York; Permanent Secretary, Dr W. W. Newell, of Cambridge; Treasurer, Dr John H. Hinton, of New York.

HERBERT SPENCER.—In response to a letter signed by more than eighty noblemen and men eminent in literature, science, and art, including Mr Gladstone, Herbert Spencer has consented that his portrait shall be painted for the English nation. Mr Hubert Herkomer will be the artist. The third volume of his *Principles of Sociology*, which completes Spencer's life-work, has recently been published.

A MONTHLY BIBLIOGRAPHY OF ANTHROPOLOGIC LITERATURE

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THE HOPI IN RELATION TO THEIR PLANT ENVIRONMENT

WALTER HOUGH

The country of the Hopi, in northeastern Arizona, is arid and semi-desert. From the last stronghold of this people on the precipitous boat-shape mesas of the high plateau, offshoots of the mountain knots of the Carrizos, one sees only barrenness, but barrenness painted beyond description. To the south the strange, fantastic outline of lava-capped buttes; to the west, beyond the plain, the faint line of the Mogollones, 110 miles away, flanked by the mighty mountain mass of the San Francisco, and to the north and east mesa after mesa fading into the horizon.

A nearer view of the plain reveals a waste of sand, sparsely dotted with the characteristic vegetation of the arid region and cut by gullies and washes, which rarely by the good will of the rain-gods give a glint of water. A few cottonwoods among the cornfields in the beds of the washes delight the eye by their dark green foliage, amid so much desolation, while on the distant mesas scattered cedars have a foothold.

Clear air, the wonderfully blue sky, and the effect of the bright sun on the many-tinted sandstone make a landscape which the dullest eye must behold with admiration.

As has been pointed out by my colleague, Dr Fewkes, the aridity of the climate has had a profound effect on the religious beliefs and practices of the Hopi. To the traveler going for the first time among the white people experiencing the severe probation of this region, water would seem to be the chief good. One might think that no conversation was ever carried on in

Arizona in which the subject of the lack of water was not a primary topic.

The rainfall is less than 10 inches per annum in the years when it rains. The snows of winter are depended on to start the spring vegetation. In August there are local thunder showers, which seem as a rule to generate over the San Francisco peaks on the west or over high mountains on the east. These cause the washes to run locally, but rarely do the washes "run through" to the Little Colorado.

Often these storms are accompanied by so much wind that the clouds are dissipated before reaching the mesas. On the strength of a storm of this character our party were libelled by the natives as being altogether bad, because we brought the wind and kept away the rain.

The wind-storms of this region are indescribable, being one of the worst characteristics of the climate. The heaviest gales are in the spring, when the wind accompanied by sand cuts the tender growths to pieces.

The winters are quite cold and windy, beginning with frosts about the close of September and often biting the early vegetation in the spring.

Owing to the elevation (6,500 feet) of Tusayan, the extreme radiation causes cool nights, which are not conducive to vegetal growth, especially as there is rarely dew.

Such is the province of Tusayan, where dwell the Hopi or "Peaceful people," driven step by step by hereditary enemies from more favorable regions centuries ago. They seem to have adapted themselves to the conditions perfectly, finding in this desert all that goes to make their life happy.

The Hopi are practically vegetarians. There is necessarily a scarcity of animal life in the desert. Sporadically wild game appears in their dietary in the shape of an occasional rabbit, prairie dog, or rat. The annual rabbit hunt of the Flute fraternity last summer, in which 25 horsemen and numerous footmen beat over a number of square miles of country, produced one specimen. Occasionally a sheep or goat, meat bought of the Navaho, or a burro varies the menu of the Pueblo.

There is quite a contrast between the vegetarian Hopi and the meat-eating tribes like the Apache and Navaho, and the contrast extends to physique and character, to roving and sedentary life, to agriculture and hunting, and to skill in the arts. This also points to the distinct origin of the Hopi under more favorable culture.

If the Sun is the father of the Hopi, then Corn is their mother. The Ceylonese are said to know sixty ways of cooking rice; the Hopi seem to have as many for corn. There are many interesting matters connected with the cultivation and uses of corn which cannot be entered into here. A sidelight on the frugality and farsightedness of the Hopi is shown by their storage of a reserve supply of corn for two years.

This leads to the observation that the food plants useful to the Hopi are (1) plants under cultivation, both native and acquired, and (2) plants the usufruct of nature. The Hopi brought from their priscan home corn, beans, melons, squash, cotton, and some garden plants. They have acquired peaches, apricots, wheat, and a number of other plants which they infrequently cultivate.[1] Of peaches they are extravagantly fond, and every village has orchards. As the crop failed last year, one of our Indian workmen at Winslow invested all his earnings in peaches, which he would have to carry 80 miles north to his native village. The apricot, of which I saw but a few trees, does not bear, probably from the lack of a fertilizing insect. Very little wheat is raised and that by the Oraibi, at their agricultural summer village of Moenkopi, where cotton also is grown.

Melons were introduced by the Spaniards; watermelons [illegible] and muskmelons [illegible]

Having plants which form the food-supply of the great civilized nations, one might think that the Hopi would be independent of or would disregard the native plants around them. On the contrary, there is almost no plant which the Hopi does not use in some way and no plant to which they have not given a name.

It is true that the Hopi extend their environment by long journeys for various substances. Every berry patch for many miles around is known and visited; a journey of 200 miles or so for salt from the Grand canyon, wild tobacco from the Little Colorado, sacred water from Clear creek, or pine boughs from San Francisco mountain, the home of the snow, is thought of little moment. To my knowledge, an Oraibi man made a continuous run of 160 miles as bearer of a note and answer. The knowledge of the resources of a vast territory possessed by the Hopi is remarkable, and the general familiarity with the names and uses of plants and animals is surprising. Even small children were able to suply the names, corroborated later by adults.

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[1] The Hopi plant corn, watermelons, muskmelons, onions, beans, gourds, chili, sunflowers, squashes, wheat, sorghum, tomatoes, potatoes, cotton, grapes, pumpkins, garlic, coxcomb, coriander, saffron, tobacco, peaches, apricots, and nectarines. They will try any seed that is given them, and among their numerous requests the demand for seed is prominent.

The ancient Hopi were apparently in nowise inferior to their descendants in these matters, as was proven by the excavations undertaken by our party last summer.

In the remains of any ancient culture, stone and bone relics stand as surviving a multitude of other articles which have perished. In many cases even bone, horn, and shell have perished and stone only has endured. It would seem that in many or most cases stone implements represent a very small part of the whole culture. While stone implements are welcome as some clew to the life of a prehistoric people, they are merely better than nothing. Pottery, carvings, and metal make the story somewhat clearer.

There is a tendency to lay too much stress on collections of stone implements *per se*, while their main interest is in their rehabilitation by surviving usages in the present.

These remarks are evoked by a field study of the Hopi tribe of northeastern Arizona with regard to their ethnobotanical and zoological environment and by a comparison of the stone relics found on the surface and in the ruinous dwellings of three ancient Hopi pueblos with the relics of softer, more perishable textures found in the cemeteries of the same pueblos.

In fact, there are some environments in which stone or imperishable materials do not exist. Imagine, for example, the culture of Mr Cushing's ancient Floridians graded by the survival of the stone or shell artifacts which they possessed.

The collection of plants made last summer forms a basis for the ethnobotany of the Hopi. It comprises about 140 species of indigenous plants, with native names and uses, extending the collection made by Dr Fewkes, the account of which was published in the *Anthropologist* for January, 1896. With Dr Fewkes' permission a number of the spring plants in his list have been incorporated in the following list for the sake of completeness.

The determination of the plants was made by Dr J. N. Rose. of the National Museum. The collection, neatly mounted and catalogued, is regarded as worthy of being placed in the national herbarium.

These plants fall under a number of classes, according to their uses for food, architecture, dress and adornment, domestic life, domestic arts, agriculture, medicine as folk medicine and empirical medicine, religion, and folk-lore.

FOOD

Kwákwi, Sporobolus cryptandrus strictus Scribn. Seeds ground with corn to make a kind of cake greatly enjoyed by the Hopi.

Shíbna, Astragalus pictus filifolius Gray. Roots eaten for food.

Tüíchima, Pectis angustifolia Torrey. Much sought after and enjoyed boiled with green corn (shammi). The Zuñi also eat it.

Tümi, Cleome integrifolia T. & G. Leaves boiled with green corn.

Tümíníngiwa, Chamæsaracha coronopus Gray. Berries are eaten.

Wikiákshopi, Epilobium coloratum Muhl. Used in making bread.

Wiwa, Acanthocheton Wrightii Torr. Cooked as greens with meat. It is known as the "ancient Hopi food," and is gathered and strung in long bunches, which hang in nearly every house. The Hopi recount that this plant has warded off famine a number of times, springing up as it does before the corn is filled.

Worshtusha, Panicum obtusum H. B. K. Seeds eaten ground with corn.

Üñátki, Atriplex argenteum Nutt. The salty leaves are boiled with fat and eaten; "very sweet." This is the earliest spring plant used for food (Fewkes).

Katókia, Dicoria Brandegii Gray. Flowers and seeds ground up and eaten.

Kōtókí, Chenopodium cornutum B. & H. Seeds and flowers eaten, the former ground and mixed with meal to make dumplings wrapped in corn-husk and called somipiki.

Kēbi, Lycium pallidum Múrs. The berries, which are much desired, are eaten raw or are dried for winter use.

Küsüñ'a, Dalea lanata Spreng. The roots are wholesome for food. They are scraped and eaten raw as a sweet.

Lakápa (probably Spanish), Phoradendron juniporinum Engelm. Used as a substitute for coffee.

Léhü, Eriocoma membranacea (Pursh) Beal. Seeds used in ancient times for food.

Mashiláshi, Solidago missouriensis Nutt. The young leaves are eaten with salt.

Müúñtoshaba, Poliomintha incana Gray. The leaves are boiled and eaten; the flowers are rubbed up and used as a flavor, which the Hopi say "tastes like brown sugar." The Mentha canadensis is also eaten as a relish.

Nünü, Sporobolus cryptandrus flexuosus Thurb. Seeds used for food.

Patáñwuba, Reverchonia arenaria Gray. The berries are sweet and wholesome.

Pihála, Portulaca retusa Engelm.? Plant eaten by Hopi.

Tü'mna, Solanum Jamesii Torr. The wild potato. The tubers are gathered, mixed with clay, and eaten.

Only two narcotics are known to the Hopi, one being Píba, or tobacco, the two species gathered being Nicotiana trigonophylla Duval and the N. attenuata Torr., and the other Shemóna, Datura metaloides DC. The use of the latter is extremely rare and is much decried by the Hopi.

Two plants are chewed in the way of chewing gum, Kopóna, Sphæralcea augustifolia Spach., and Poáwi, Eriozonum corymbosum, the mucilaginous stems of which are employed.

Ishü, Stanleya albescens Jones. The leaves are boiled and eaten in the spring.

Pasípna, Astragalus pictus filifolius Gray. The roots are eaten raw as a sweet.

Yowípsi, Ribes cereum Dougl. The berries are eaten.

Yün'yü, Opuntia. The stem is boiled and eaten in the spring when food is scarce.

Samóa, Yucca baccata Torr. The fruit is eaten.

Hési, Calochortus aureus Watson. The root is eaten raw.

Sü'rswa, Chenopodium album L. The leaves are boiled and eaten with fat.

Posíüh, Amaranthus blitoides Watson. The seeds were formerly used as food.

Nanákopsi, Monarda citriodora Cerv. This plant is boiled and eaten only with hares.

Mü'ha, Lygodesmia grandiflora T. & G. The leaves are boiled with meat.

Lüktánkya, Artemesia dracunculoides Pursh. "In the early spring the leaves are gathered and brought home, baked between hot stones, and eaten after dipping in salted water" (Fewkes).

Kuranto (Spanish), Coriandrum sativum L. The plant is dipped in stew and eaten as a condiment.

Sále, Mentzelia albicaulis Dougl. Seeds are parched and ground; it is eaten in pinches from the wicker tray in which it is served (Fewkes).

Hoyávako, Atriplex confertifolium Watson. Its scented leaves are boiled in the water used to mix corn pudding.

HOUSE-BUILDING

Wórshi, Muhlenbergia pungens Thurb. Bunches of this grass are used in the upper layer over the kahabi brush in the roofs of houses.

Kahábi (no specimen). Brush from this shrub used as the first layer in the ceiling and roof.

Pashihüirpbe. Populus monolifera Ait. For roof beams. The most valuable tree known to the Hopi, by whom it is planted.

Móhu, Yucca angustifolia Pursh. Woven to make hoods for fireplaces.

DRESS AND ADORNMENT

Hóko, Juniperus occidentalis Hook. The seeds are pierced and strung as beads. The ancient graves yield examples.

Arátsi, Pentestemon ambiguus Torr. The flower is worn for adornment.

Ishákana, Verbesina enseloides B. & H. Flower worn by children in the hair on the forehead.

Wórshi, Muhlenbergia pungens Thurb. The flower stem is used for hair-brushes.

Wupámansi, Castilleia linariæfolia Benth. The flowers are worn for adornment by the girls. The name means "the great girl flower." It is one of the very few attractive and beautiful flowers of this region and may be appropriately called the Hopi national flower.

——, Solanum elæaginifolium Cav. The yellow seed apples of this plant are often strung for necklaces.

DOMESTIC LIFE

Hanoshivápi, Bigelovia graveolens Gray. So named because the Tewans of the pueblo of Hano carry great bundles for firewood.

Hóko, Juniperus occidentalis Hook. Called "arrow wood." The principal firewood; from the bark the slow match is prepared.

Kotókshiluvi, Parryella filifolia T. & G. The twigs of this plant are used for snow brooms.

Tü'vü, Pinus monophylla Torr. & Frem. Excellent firewood. The gum is used for chewing and in the arts.

Móhu, Yucca angustifolia Pursh. The root is used for soap, notably for washing the hair in religious ceremonies.

Topílchi, Humulus lupulus L. Wild hops are used to make yeast, according to Mongwe.

The shells of gourds are much prized for dippers, funnels, and other vessels.

Towü'vapi, Bœrhavia erecta L. The plant, which possesses sticky leaves and stems, is sometimes hung in the houses to catch flies.

Samóa, Yucca baccata Torr. The root is used for soap.

Müyítka, Senecio douglasii DC. The top of this plant is used as a brush to remove the hair spines from prickly-pears.

ARTS

Sü'ovi, Atriplex canescens James. The ashes of this plant are used to give a gray color to piké.

Kómo, Amaranthus sp. Cultivated in terrace gardens around the springs and used for dyeing piké red.

Komótoshu, Amaranthus Palmeri Watson (?). From the seeds a red dye is prepared for Kachina piké, a paper bread consumed during the Kachina dances.

Oháishi, Thelesperma gracile T. & G. The whole plant is used to make red-brown dye for basket splints.

Akdüshi, Helianthus petiolaris Nutt. The blue dye which the Hopi impart to their blankets is prepared from the seeds of the sunflower.

Ása, Sisymbrium canescens Nutt. The seeds of this plant are ground up in a stone mortar, forming an oily liquid, which serves as a medium for the iron paint used in pottery decoration.

Móhu, Yucca angustifolia Pursh. This plant has many uses in the arts for basketry, paint brushes, tying material, etc.

Kotókshiluvi, Parreyella filifolia T. & G. The ashes of this plant are used to color piké.

Tü vü, Pinus monophylla Torr. & Frem. The gum was used as cement in the ancient turquois mosaics as it is in the modern. A few specimens of pottery made by Nampio are glazed with piñon gum.

Shemótala, Calamovilla longifolia (Hook) Hack. The long canes are neatly twined into the ceremonial wedding-blanket covers.

Pieces of gourd are made into smoothers for pottery.

Cübi, (?) Rhus trilobata Nutt. The twigs are used for coarse basketry.

Samóa, Yucca baccata Torr. The root is used for soap and the leaves for basketry.

Patü'saka, Panicum autumnale Bosc.

Tákashü, Hilaria Jamesii Benth. The grass used by women in making the coiled baskets.

Asapzraṇi (Spanish), Carthamus tinctorius Linn. Saffron, used to dye piké yellow.

Agriculture and Forage

Harü'si, Bouteloua oligostachya (Nutt.) Torr. Forage grass for animals.

Pawia, Franseria Hookeri Nutt. Food for sheep.

Poshíotosü, Amaranthus blitoides Watson. Also eaten by sheep.

Tahoyókpi, Chenopodium olidum Watson. Also eaten by sheep.

Kwákwi, Sporobolus cryptandrus strictus Scribn. Fine forage grass.

Sü'ọbi, Atriplex canescens (Pursh.) James. Eaten by horses.

Takáshü, Hilaria Jamesii (Torr.) Benth. Good grass for horses.

Tavótka, Eurotia lanata Moq. Horses like it very much. The twigs are eaten by them in winter.

Pĕzrü, Aristida purpurea Nutt. Bad forage for animals on account of the awns.

Kwavü'tushü, Munroa squarrosa Torr. This grass is covered with fine down, which causes horses to cough and choke when they attempt to eat it.

Tuiíñwei, Oxytropis Lambertii Pursh. This is the "loco weed," so injurious to horses.

Homítskapü, Krynitzkia sp. The evil burs get into wool and in many ways are troublesome to man and beast.

Brush from a number of plants is employed in the cultivated fields for windbrakes or sand sheds. Brush is also placed in gullies to prevent washing, and brush dams are made to form level places by the collection of the sediment. Crops are planted on the deltas so formed.

MEDICINE

Chacháume, Townsendia Arizonica Gray. Women boil the plant to make tea to induce pregnancy.

Chiuíña, Astragalus mollissimus Torr. Said to be a good medicine for headache; the leaves are bruised and rubbed on the temples.

Monáhaña, Artemisia Canadensis Michx. Rubbed up and placed on the temples for headache.

Máiĕtka, Senecio douglasii DC. Rubbed on the limbs for rheumatism and soreness of the muscles.

Mamáuti, Aster sp. Tea is made from the flower and given to young girls to make them fruitful.

Pĭñá, Polygonum ramosissimum Michx. Ground on a stone and used as a plaster; the effect is heating. Women drink a tea infused from the leaves to increase milk.

Poáhi, Erigonum corymbosum (?). Infusion made and drank by women to expedite child-birth.

Tahoóvapi, Gaura parviflora Dougl. Tea made from the root for snake bite.

Tüwázhriapi, Ranunculus cymbalaria Pursh. Known by the Hopi as "Navaho medicine."

Wütákpala (no specimen). Rubbed on the breast or legs for pain.

Ishákana, Verbesina enseloides B. & H. Used on boils or for skin diseases.

Kawíkana, Croton Texensis Muell. Taken as an emetic to relieve the stomach.

Koicháña, Allionia linearis Pursh. Boiled to make an infusion for wounds.

Kokyáña, Brickellia Wrightii Gray. Called "Navajo tea."

Lakápa (Spanish), Phoradendron juniperinum Engelm. The Navaho and Hopi make a beverage, which they say is like coffee, from this mistletoe. A larger species on the cottonwood tree, called "lo mapi," is used as medicine.

Maiíbĭ, Bigelovia douglasii stenophylla Gray. Infusion used for bathing bruises and wounds.

Ohá'ishi, Thelesperma gracile T. & G. Tea for headache is made from this plant.

Pámnavi, Gutierrezia euthamiæ T. & G. Tea for fever is made from this plant, in combination with three other plants.

Piiñà, Polygonum ramosissimum Michx. Ground on a stone and used as a heating plaster.

Poáhi, Erigonum corymbosum (?). Infusion drank for disorder of the stomach.

Tavótka, Eurotia lanata Moq. One of the ingredients of tea for fever.

Tawázhriapi, Linum rigidum Pursh. Taken as tea for stomach disorder.

Tüpelorálchu, Chrysopsis villosus Nutt. Pain in the chest cured by a tea made from the leaves and flowers.

Wĕi, Aplopappus sp. The root is boiled to make a tea for cough.

Páláñi (no specimen). The plant grows at Awatobi, where the roots are gathered to make tea for colds.

Kütsibsü, Biscutella wislizeni B. & H. The leaf is dried, rubbed to a powder, and sprinkled on wounds.

Sübi, Rhus trilobata Nutt. The buds are regarded as medicinal.

Napalü'ña, Artemisia tridentata Nutt. "An infusion of the leaves is drank by a person whose ailment is supposed to be in the ilium."

Pitñí, Asclepias verticillata L. An infusion is drank to increase the flow of milk.

Religion

Shĕmótala, Calamovilfa longifolia (Hook.) Hack. Carried in the Humis Kachina.

Chuóshi, Aster sp. Mixed with sacred tobacco.

Maíbĭ, Bigelovia douglasii stenophylla Gray. A component of the Shaqua paho.

Tüminala, Martynia proboscidea Glosc. Part of the soyalana paho; plant male.

Hovápüi, Artemisia tridentata Nutt. Used in the flute paho.

Pámnavi, Gutierrezia euthamiæ T. & G. Used in the snake paho.

Tewi, Sarcobatus vermiculatus Torr. One of the four sacred kiva fuels.

Pashehürp'bi, Populus monilifera Ait. The peeled shoots are used in preparing the pahos or prayer-sticks for all ceremonies. Tihus, parts of masks, fire-sticks, plume boxes, etc, are carved from the wood.

Hohoyána, Physaria Newberryi Gray. "This plant is one of the ingredients of the snake charm or antidote drank after the Snake dance by all who have taken part as snake priests" (Fewkes).

Soróbsi, Delphinium scaposum Greene. Flowers are ground with corn to make blue meal, "blue pollen," for the flute altar.

Cübi, Rhus trilobata Nutt. Twigs used for ceremonial purposes; the branches are one of the four ceremonial kiva fuels.

Póna, Equisetum lævigatum Braun. Dried and ground with corn to make the sacred bread called ponoviki.

Hési, Calochortus aureus Watson. The flowers and seeds are ground with meal to make yellow pollen for the flute ceremony.

Kü'iña, Artemisia frigida Willd. Used in pahos.

Süóvi, Atriplex canescens James. One of the four kiva fuels.

Sivwápi, Bigelovia Howardi Gray. The dried plant is one of the four kiva fuels. "An infusion of the flowers is used to color a chalky stone employed as a personal decoration during ceremonies" (Fewkes).

Kivi, Lycium pallidum Miers. The entire shrub is used in the Niman Katcina.

Pi'ba, Nicotiana attenuata Torr. Smoked on all ceremonial occasions.

Cotton is cultivated almost exclusively for ceremonial purposes, its chief consumption being for the string employed in assembling the elements of the pahos.

Folk-Lore

Kolnákawa, Erigonum Thomasii Torr. The big rat, Kalna, eats this plant; hence its name.

Pámnavi, Gutierrezia euthamiæ T. & G. This plant, which grows with the mäíbí, Bigelovia douglasii stenophylla Gray, is called the child of the mäíbí.

Pi'tñá, Polygonum ramosissimum Michx. This plant exudes a milky substance when broken, and hence is used to increase a scanty flow of milk in nursing mothers.

Powü'üsi, Abronia micrantha (Torr.) Choisey, and A. fragrans Nutt. Placed on a child's head to induce sleep.

Sóayañ'a, Alliona nyctaginea Michx. (Oxybaphus nyctagineus Sweet). This plant is named for the bat. When babies will not sleep in the daytime they are washed in a decoction of this plant, because the bat sleeps during the day.

Tüminala, Martynia proboscidea Glosc. The plant is male; gender of plants.

Hohoyáña, Physaria newberryi Gray. Named from the Asida rimata or prayer beetle and nahu charm.

Ása, Sisymbrium canescens Nutt. One Hopi clan bears the name of this plant. (See legend given by Dr Fewkes in *The American Anthropologist* for January, 1896, p. 15.)

Léhü ,Oryzopsis cuspidata Benth. Also the name of one of the clans.

Máryitka, Senecio douglasii DC. The name means "mole corn." "Many plants are thus assigned to animals supposed to hold them in special favor" (Fewkes).

The following summary, in which the duplications have not been eliminated, gives the number of plants falling into the general classes. As there are probably not over 150 indigenous species in the environment, this list shows the thorough way in which the Hopi have made use of their plant surroundings.

Agriculture and forage (not cultivated)	11
Arts	16
Architecture	4
Domestic life	10
Dress and adornment	6
Folk-lore	10
Food	40
Medicine, folk and empirical	29
Religion	18
	144

Comparatively late in the study of the new science of ethnology has attention been called to the preëminent importance of the environments of tribes. The idea has been known for centuries; the scientific renaissance brought it into prominence along with more careful methods of observation and more accurate division of the field into special subjects for observation.

While tribes have been modified by environment and by changes in environment, too much, perhaps, has been attributed to it, from incompleteness and lack of observation.

Years ago some writer propounded a theory for the various complexions of the human race, explaining that men became lighter in proportion to their distance from the equator. Buckle produced also many similar delusive generalizations, giving too much influence to material surroundings and too little to the genius and brain of man.

Without doubt, in the coming years a sufficient body of conscientiously observed facts will be collected from which generalizations may be deduced. There are, no doubt, subtle influences due to life in the desert, the plain, the mountains, and the seashore and islands, ease or difficulty of intercourse, which modify peoples. It is well understood that there is a relation between environment and health, and that the struggle for subsistence makes or unmakes peoples.

The Hopi are one of the most interesting of the North American tribes. Their long isolation from geographical conditions has kept them unmodified by the influences which have changed most native tribes. In the last few years the wedge of civilization has entered, however, and before long it will be too late to make the studies which are so desirable and of so much importance to the science of ethnology. It is earnestly hoped that the Hopi may be thoroughly studied in regard to their natural environment, ceremonials, and arts as speedily as possible.

The Lamborn Bequest.—By the will of the late Dr Robert H. Lamborn the Academy of Natural Sciences of Philadelphia has been bequeathed his entire estate, aggregating about $200,000, the income to be used for biological and anthropological research. It is expected that the Academy will now be enabled to have a curator of archeology, its excellent collections in that line having necessarily been somewhat neglected in the past owing to the lack of funds.

STONE IMAGES FROM TARASCAN TERRITORY, MEXICO

FREDERICK STARR

In the December number of the *American Anthropologist* appeared an interesting article by Dr Cyrus Thomas on stone images from mounds and ancient graves of our southern states. The author called attention to "a somewhat conventionalized form indicative of local origin." Some eight specimens were described or referred to, four of which were illustrated in the paper. Two others of the eight, while not pictured by Dr Thomas, are figured in Thruston's *Antiquities of Tennessee.* There are but two points in which all of the eight agree—(1) the sitting posture and (2) the slanting, upraised face. The position of the hands and feet varies considerably. In three out of the eight the lower part is said to be incomplete—but rudely, if at all, worked to shape. General Thruston's specimens are notable in the agreement they show in the round, broad faces. The headdress or hair varies considerably. To show this we may tabulate the eight specimens thus:

1. Castilian Springs, Tennessee—fillet.
2. Castilian Springs, Tennessee—cap.
3. Bartow county, Georgia—knot.
4. Bartow county, Georgia—handle.
5. Trousdale county, Tennessee—head bare.
6. Smith county, Tennessee—head bare.
7. Roan county, Tennessee—chignon.
8. Union county, Illinois—triangle incised on back.

All of the specimens are emphatically stated as from within the "stone-grave area." This is likewise the area of the carved or engraved shell-gorgets.

Stone figures of a very similar type to this are found in one part of Mexico. In the Tarascan region of the states of Michoacan and Jalisco the seated figure of stone with upraised face is both characteristic and common. We may describe and illustrate several of these. It would be easy to mention many more.

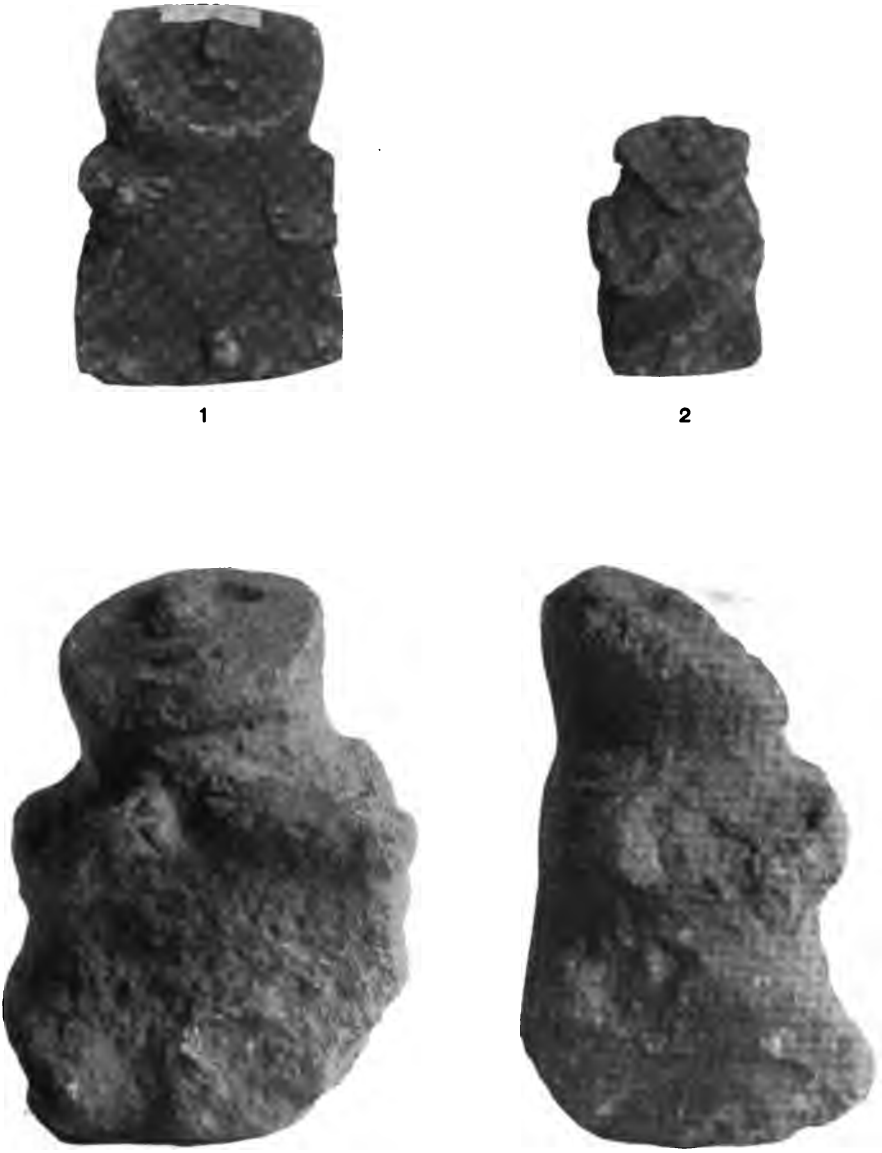
No. 1, from Kalatemba, is in the museum of the state college at Morelia, Michoacan. It is of sandstone and is of indifferent workmanship. The back is nearly vertical and plane. The hands, which are but rudely indicated, rest upon the chest.

The lower part is badly made. A small prominence near the base is probably a rude representation of the sexual organs. The face is absolutely comparable with those of General Thruston's figures, being round, broad, flat, and slanting. An incised line across the head (partly concealed by the label) apparently indicates a headdress. The figure is seven and a quarter inches high. (See figure 1, plate v.)

No. 2 is from near Tzintzuntzan. It is a sandstone figure of a female. In general character, head position, genitalia, etc, it is much like the preceding. The hands rest upon the chest and the arms are folded against the sides. The headdress, with incised lines at top, is somewhat shown in the cut (figure 2). The woman bears a child strapped to her back; the infant faces backward. The height of this figure, which is also in the Morelia museum, is five inches.

No. 3, from Tzintzuntzan, was presented to me by Mr H. P. McCormick. It is of a reddish-brown stone, in texture much like sandstone. It is very like the two preceding, but the legs are seen to be bent under the figure (figure 4, plate v). The broad, round, upraised face with eye-holes and mouth simply scooped out, and with low, broad nose, is of the same type as the above and as General Thruston's specimens. There is no cap or headdress. The hands and arms are rudely made, but distinct and in the usual position. The figure measures four inches high. (See figures 3, 4.)

No. 4 is the most remarkable piece of work I have seen from Tarascan territory. It is from near Guadalajara, in Jalisco, and was presented to me by Mr D. A. Wilson. It is made of a fairly compact, olive-gray material. It is a grooved axe. The whole surface is polished; less about the groove than elsewhere. The edge, made with much care, is fairly sharp. The upper end is a finely executed human head, with the face upraised at about the usual angle for this type. The groove comes at the location of the neck, while the arms, carefully defined at the sides, are bent so as to bring the hands—not detailed—to the upper part of the chest. The figure is not squat, but seated, and the bent legs are admirably developed. Examining the head carefully, we find the face broad and round, the eyes carefully worked out, the mouth projecting and with the commissure of the lips marked, the nose well made. Over the head fits a headdress like a close-fitting cap, covering the ears, which cause it to pro-



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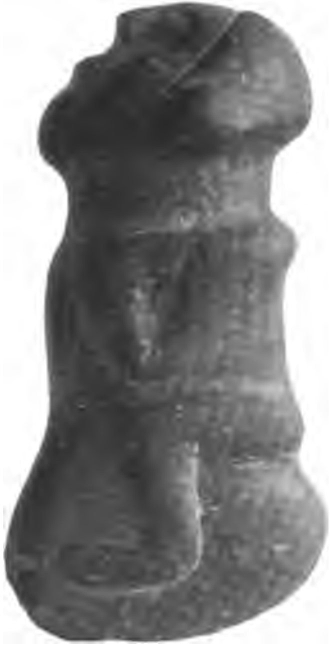
3 4

STONE IMAGES FROM TARASCAN TERRITORY, MEXICO



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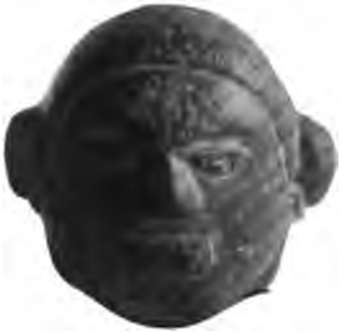

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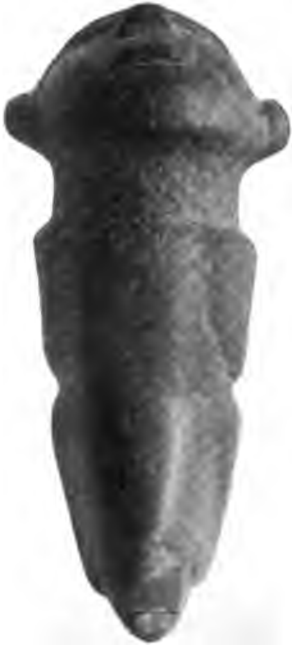

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VIEWS OF A FIGURINE AX FROM MEXICO

ject in two regular rounded prominences. The pictures convey a better idea of this pretty piece than does a description (figures 5, 6, 7, plate VI). This specimen measures four and a half inches.

This occurrence in Tarascan territory of stone figures with upraised faces of the same type as the Tennessee specimens appears to me of considerable interest. I have recently called attention to the finding in the same part of Mexico of a beautifully carved shell gorget, strictly comparable with those of the stone-grave area.[1] The occurrence of a second so characteristic type in the two areas is certainly curious.

As to the meaning of the upturned face, I am personally inclined to believe that Haygood was right in considering it to indicate adoration. I cannot find in any of the figures given by Thomas or Thruston, nor in the Mexican specimens, any reason for considering the heads artificially deformed; in fact, every specimen distinctly evidences against such a view.

CONNECTING LINKS.—Volume 1, part 4, of the Publications of the Louisiana Historical Society has just appeared. If the reader will turn to plate II, figure 1, opposite page 25, he will see a handle of a dish very much in the form of the head of a monkey or other animal. Opposite page 372 in the report of the Smithsonian Institution for 1876, in my article on the Latimer collection, will be seen six handles of dishes very much of the same form and motive, and presenting a very striking similarity. This type of modelled handle luted on to dishes has been treated by Professor William H. Holmes, and in these two examples we have Porto Rico on the one hand and the mound in Louisiana brought into interesting comparison. It will be recollected also that Professor Holmes called attention to the meander pattern, figure 9 in the same paper, and in the paper on the Guesde collection, in Guadeloupe (Smithsonian Report, 1884, pp. 828–832), I have spoken of the weaving of bands of cotton around the arms and legs of figures; also historically mentioned with regard to the Indians of Louisiana.

These little threads of connection are very interesting in the light of discoveries which have lately been made in southern Florida by Mr F. H. Cushing. O. T. MASON.

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[1] Proc. Davenport Acad. Sci., vol. VI, pp. 173-178.

DEATH-MASKS IN ANCIENT AMERICAN POTTERY

F. S. DELLENBAUGH

In depicting the human face, the natives of North America have not been successful. Particularly is this the case in what is called the Atlantic group—that is, those tribes east of the Rocky mountains. In Mexico some of the ancient people had achieved a fairly high mark in the direction of art, and this skill seems to have filtered in varying degree along the Pacific coast as far as the northern limit of the present Haida Indians; yet even in Mexico the human face was not treated broadly and dexterously, but was customarily drawn or modeled as elsewhere—more or less weakly, without ears, in profile. The ear was not shown or was hidden by some kind of ornament. Much of the work of the Pacific group commands respect from an art point of view, and sometimes admiration; but throughout the Atlantic group, excepting the graceful forms of the moundbuilder pottery, it may be said there was little art development. Some of the moundbuilder pipes are interesting, and exhibit a moderate degree of dexterity in modeling objects familiar to them, but they seldom endow the object with its rightful beauty or express it with accuracy or artistic force.

When we come to the human head and face, the attempts to reproduce it are generally, from an art standpoint, merely ludicrous. What, then, are we to conclude when suddenly we come upon a group of funeral jars from Arkansas bearing some truly remarkable and accurate human faces? We may select for examination the best of these image vases, so far as I know them—the one so accurately engraved for Mr Holmes' article in the Fourth Annual Report of the Bureau of Ethnology, and numbered figure 420, page 407. Are we now to follow a time-hallowed custom and deduce from the extraordinary excellence some equally extraordinary theory? Say, perhaps, that while out sailing some pupil of Phidias was blown out of his course by an easterly gale and, scudding past the Pillars of Hercules, landed on the Atlantic coast of North America, whence immediately he proceeded inland to Arkansas for the express purpose of teaching sculpture and executing these strangely perfect vases;

or shall we rather say a tribe of Aztecs came up to Arkansas and then went home again? Hardly. Better let us accept the easiest, most probable solution, and admit that ordinary redmen, who lived for ages in the region, are responsible for these unusual vases, and we will then try to explain how it came about that a few should have been able to acquire such great and rare skill; for the free-hand skill that could produce the vase under discussion must assuredly be nothing less than great and rare.

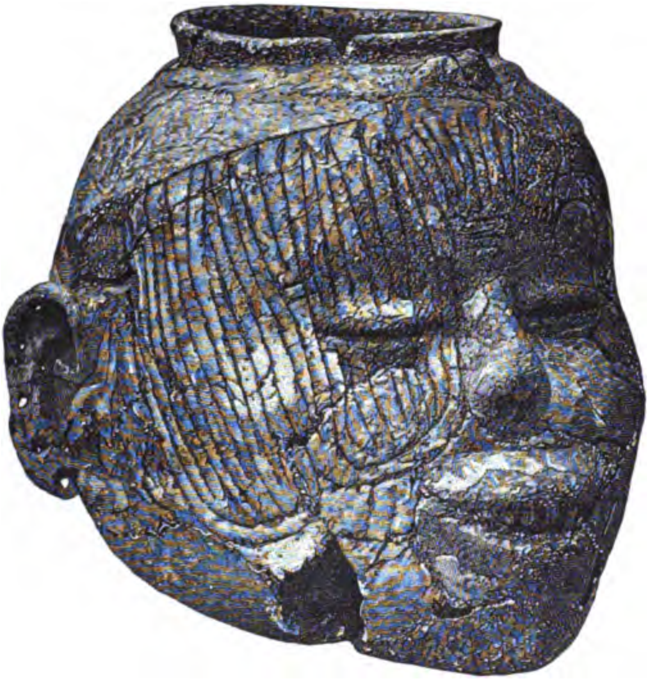

FIG. 1.—Head-shape vase from Pecan Point, Arkansas (½).

Here we look on a face perfect in its proportions, accurately modeled, and, above all, depicting death with a master-hand; yes, more, presenting to the spectator death itself as it seized this personage in the long-forgotten past. Here is death present with us as plainly as it is in the well-preserved features of an Egyptian mummy. He is certainly a great artist who can do this. How did our untutored redman achieve this wonderful result? How perpetuate the awful silence of a mouth the fleeting spirit left ajar? How eternalize the eyelids a short time before closed to light forever, now striving to open to eternal darkness? With marvelous fidelity this jar represents these things; presents them with a genius that, notwithstanding the centuries gone, enables us to sight the shadow of the Death Angel's wings!

Now, is it likely that the redskin artist who never succeeded in modeling any other object accurately should so wonderfully triumph with the most difficult object in all nature, the human face? I think not. What, then, is the explanation? To me it seems perfectly simple. A process of some kind must have been used; probably the process known and used for ages by sculptors. Clearly the face on this jar is a death-mask. Soft clay was pressed upon the dead features, and when sufficiently dry it was removed and other soft clay thinly pressed into the mold obtained. The mask thus made was built upon till the jar before us was completed. In this conclusion there is nothing improbable. Some accident revealed the method to the red artist, and it was utilized in making these urns for burial with the remains of distinguished individuals. In no other way, it seems to me, can this vase be satisfactorily explained. Mr Holmes describes the vase as follows:

> The finest example yet found is shown in figure 420. In form it is a simple head, five inches in height and five wide from ear to ear. The aperture of the vase is in the crown and is surrounded by a low, upright rim, slightly recurved. The cavity is roughly finished, and follows pretty closely the contour of the exterior surface, excepting in projecting features such as the ears, lips, and nose. The walls are generally from ⅛ to ¼ of an inch in thickness, the base being about ⅜. The bottom is flat, and takes the level of the chin and jaws. . . . The face cannot be said to have a single feature strongly characteristic of Indian physiognomy. We have instead the rounded forehead and projecting mouth of the African. The nose, however, is small and the nostrils are narrow. The face would seem to be that of a youngish person, perhaps a female. The features are all well modeled, and are so decidedly individual in character that the artist must have had in his mind a pretty definite conception of the face to be produce as well as of the expression appropriate to it, before beginning his work. It will be impossible, however, to prove that the portrait of a particular personage was intended. The closed eyes, the rather sunken nose, and the parted lips were certainly intended to give the effect of death. The ears are large, correctly placed, and well modeled.

In this Mr Holmes assumes, apparently, that the artist of this remarkable vessel modeled it free-hand without the object before him—in other words, that it is purely ideal. I am of opinion this would have been an impossibility. The redman never lived and I believe never will live who could impress such individuality on clay, either from his imagination or from the model. Such conception and execution would be remarkable even in an artist descended from an esthetic race, and there is no evidence that an esthetic race existed on this continent in any precolumbian time. I believe this vase and similar work have been regarded by some as evidence of the former occupancy of this land by a race different from the redmen, but its very accuracy is evidence against such a theory. A race so different from the redman as to be capable of producing a face like this would have left other and abundant testimony of their skill. They would, in all probability, have left hands and feet; arms, legs, and torsos, as well; for without constant practice in these things how could they have attained this perfection? Art is certainly a growth in any land, not an explosion.

There is only one way, then, in my opinion, that this vase and its companions could have been produced by any being who ever occupied the territory where it was found, and that is by the method I have described. The cut of figure 420, herewith reproduced in our figure 1, is half size. I can discover no special resemblance to African features. An eminent artist to whom I showed the cut, and who did not know the connection, thought the features resembled those of the Chinese. All that I can see in them is a young redskin, somewhat distorted by disease and death. The age might be anywhere from ten to sixteen, if a male, and fourteen to twenty, if a female. The nose seems to be one that might become strongly aquiline. The face is not, after all, as small as the size of the jar at first glance would seem to establish, and this discovers a discrepancy in scale between it and the remainder of the vessel, proving that when the potter left the guidance of his mold or cast he was lost, and rounded up the vase too soon and too small to accord with the features. Not all the potters were entirely successful with their molds, as some faces show by considerable distortion, due doubtless to clumsiness and lack of care in the handling.

For the purpose of comparing the chief portions of Mr Holmes' figure 420 with some standard, I measured the features of two white boys representing the average at about ten years, and also an adult white man and woman and placed the measurements beside those of the vase (the vase measurements were made from the engraving). The accompanying plan (figure 2) shows that as between the white boys (whose measurements were identical) and the vase there are no great differences. The forehead of the white boy is one-half inch higher, but a redskin lad of about the same age might easily have this difference, while the potter also may not have extended his cast to the hair-line exactly, or he may have found it desirable to trim down the rough edges of the mold along the top, on account of its sticking to the hair, before removing it from the face. The white boy is one-half inch wider across the eyes. The nose is the same to the base from the eyebrow line. The upper lip is the same. The chin on the vase is one-fourth inch longer, but as an allowance of about that amount must be made for the open position of the mouth, the measurement is practically the same. This gives a very close resemblance between them, and leads to the inference that the face on the vase is that of a lad of about sixteen.

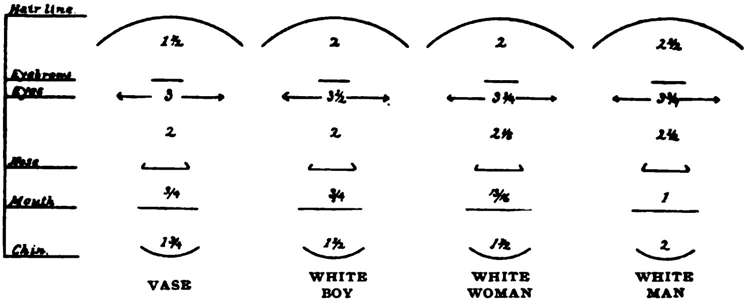

FIG. 2—Comparative measurements of vase and human heads.

The ears have several perforations in each, which Mr Holmes thinks reveal a custom of the tribe. With this I must differ, for the reason that at the top of the face is a perforated knob, which must have been made for suspension by a cord. In that case two other cords were necessary to hold the vase in balance, and these two cords would be obliged to come down at the back and on each side of the head for attachment. The only available projections for such an attachment are the ears, and the perforations, it seems to me, were for that purpose. The ears being thin, the cords were probably woven in and out, for strength, through the several perforations. On the other hand, the knob, being thick and strong, needed but one hole for the cord attachment. The ears, being of good shape and correctly placed, were probably cast along with the face, anatomical correctness not being within the redman's grasp except by mechanical process of some kind. The engraved devices were executed, says Mr Holmes, after the clay had become hard. The reason for this was that on account of the molding process it could not be done before. The vessel would require drying before the mold could safely be removed. The interior of the wall follows the exterior closely except in projecting features. The potter, finding it difficult, as well as unnecessary, to work the clay evenly into the projections of the mold, filled them up more or less solidly. This would also make the features more durable and guard against openings being left to make the jar useless for its purpose. The nose, eyes, and mouth projections, then, would require to be well covered over to prevent leakage. Hence a reason why the wall inside does not follow the exterior surface of the projecting features. Altogether, therefore, it seems that this human face must have been reproduced from death by some mechanical process; in all probability the one that I have described. The face must be a death-mask; it can be nothing else.

PEABODY MUSEUM.—At the beginning of the year the Peabody Museum of American Archeology and Ethnology was transferred to the corporation of Harvard University. The Museum will henceforth be conducted by the faculty in place of a board of trustees. The faculty consists of President Eliot, Professor F. W. Putnam, and Messrs C. P. Bowditch, F. C. Lowell, and Stephen Salisbury. Professor Putnam remains the curator, as before. For some years there has been a division of American archeology and ethnology in Harvard. Professor Putnam has always been chairman, and instruction has been given in the Museum.

PROFESSOR EDWARD S. MORSE lectured before the Archeological Association of the University of Pennsylvania on January 15, his subject being Japanese Archeology. The lecture was largely attended.

NOTES AND NEWS

RECENT ARCHEOLOGIC FINDS

Florida.—Dr Charles E. Rowell recently began the excavation of a large mound in a dense forest undergrowth near Punta Gorda, which he discovered while hunting.

Georgia.—President Smalling, of the Bainbridge Graded school, and School Commissioner Bradwell have commenced the excavation of an extensive burial mound about 4 miles from Bainbridge. Many human bones in an advanced stage of decay were found, and the remains of what appeared to be pyral hearths were uncovered.

Kansas.—On the Beavers farm, 2 miles eastward from Arkansas City, are located a number of mounds from 8 to 12 feet in height, in most of which excavations have been made from time to time. Recently, however, Drs C. S. Acker and N. H. Hunt have conducted excavations in one of the earthworks, and have found what appears to be a sort of rude plinth of stone, on the top of which was a large urn-like vessel of earthenware. A quantity of ashes is reported to have been found in the vessel and on the stone structure, but no bones or implements were discovered.

Kentucky.—During the excavation of a mound near May's Lick, a short distance north of Lexington, Kentucky, under the auspices of the American Museum of Natural History, New York city, there was exposed a stone cist containing the skeleton of an adult male. The bones, stones, and even a quantity of the earth were shipped to the museum, where they have recently been placed on exhibition. The mound as it appeared when the remains were exposed is accurately shown, each bone being laid in place precisely as when found, backed by a sectional view of the mound as the excavation left it. This is probably the only mound grave that has been removed entirely and placed, with a section of the mound itself, on exhibition in a museum.

Minnesota.—It has been found that the cave which was explored in December last at Lamoille, 15 miles from Winona, Minnesota, is identical with the cave examined and described by Jonathan Carver in 1766. According to Carver, the walls of the cave were covered with Indian pictures of buffaloes, snakes, bears, rabbits, and other beasts and were of great antiquity. The recent exploration found the pictures as described over a century ago.

New Jersey.—A report comes from Egg Harbor that Constable George Sneft, while recently hunting in a dense forest between Pomona and McKee City, discovered the remains of numerous huts that had been constructed of hickory, scattered over an area of several hundred feet. A couple of skulls, a tomahawk, some spear and arrow points, a quantity of flint chips, and several old flint-locks were found. Some of the huts were still in fair condition. The tract, which is covered by a heavy growth of underbrush, bore no evidence of having been visited for at least half a century.

New York.—Captain R. D. Wainwright, United States Army, retired, has recently found Indian skeletons in the shell-heaps near the old Billopp house at Tottenville, Staten island. Near one of the skeletons (the teeth of which were closed on the fingers of the right hand), and partly supporting it, was a ball of sand and bones, which was covered on one side with shells of land turtles.

Ohio.—Mr James Hollister and three companions, of Columbus, Ohio, while prospecting in the northeastern part of Franklin county, in the hills of Big Brush creek, discovered in limestone formation an apparently artificial tunnel 3 feet wide, 6 feet high, and extending inward for 45 feet, terminating in a chamber 12 by 9 feet and 6 feet high. Scattered about the floor of the cavern were a large number of peculiarly formed pieces of decorated pottery, a large mortar and pestle of limestone, and a number of flint arrowpoints and other stone implements.

Tennessee.—A mound on the east bank of Citico creek, Tennessee, was excavated on January 19 by a party from Chattanooga, potsherds being the principal collections unearthed. These, with the other relics, were placed on exhibition at the Southern hotel, Chattanooga, where they attracted considerable attention.

Seven extensive mounds have been discovered at the mouth of White creek, near Towstring, Tennessee, while along Tennessee river, within 10 miles of the point named, many mounds are reported.

Mexico.—Mr L. F. Janner and a party of five assistant archeologists from Philadelphia have begun the excavation of an ancient ruined city in the state of Chiapas, west of the city of that name. The ruins were discovered several months ago by Mr Janner while exploring that region.

The Yakuts of Siberia.—As is well known, it has been much disputed whether the Yakuts are an indigenous race or have migrated from more southern latitudes, the latter view being more generally accepted at the present day. According to their own traditions, they are descended from two famous marauders, who, having made themselves objectionable in their native country, were obliged to fly northward, and, on reaching the river Lena, sailed down it to a point a little to the south of Yakutsk. M. Seroshevski (the author of *Yakuty. Opyt etnograficheskavo Izsliedovaniya*, St Petersburg, 1896) sees a confirmation of the truth of this legend, in its main outlines, in the fact that the Yakuts have names for the lion, camel, serpent, tiger, and other animals which do not exist in the present home of the people, and that these names, as well as others, have a resemblance to those used among the Turkish and other tribes of the south; but he confesses that it is very difficult to discover their original home, and almost impossible to decide at what period they migrated into their present territory.—*Scottish Geog. Mag.*

Tabu of Relationship Names.—In accordance with the universal (East) Indian custom among the Bâgarî Jâts in Sirsâ, a man will not speak of or address his wife by her name, but will use the name of her *gôt* or clan, calling her, for instanse, Gôdârî, if she be of the Gôdârâ clan. The clan name is that of her father. There is a very general rule in the Eastern Pañjâb against speaking of one's wife's father as "father-in-law" (*susrâ*). The Musalmâns of Sirsâ call him "uncle" (*tâyâ* or *châchâ*); the Brâhmans of Gurgâôn, Pandit Jî or Misr Jî; the Kâyaths, Râi Sâhib; the Baniyâs, Lâlâ Sâhib or Sâh Jî; the Mêôs, Chaudhrî or Muqaddam, or—a specially Mêô usage—*dôkrâ* or "old man"; insomuch that if you call a Mêô woman *dôkrî*, she will fly at you with, "Do you call me your mother-in-law?" while if you address her as *burhîyâ* (old woman in general), she will reply, "*Achchhâ betâ achchhâ!*" (Good, my son; good).—*Indian Antiquary.*

SCOTCH REMEDIES FOR WARTS.—*Dalry.* The juice of the dandelion rubbed on warts dispels them.

Kirkmaiden. Rub the wart with the red-hot stalk of a new clay tobacco pipe. My informant has seen this done.

Kells. Rub the wart with a black snail. My informant has done this.

Kirkmaiden. Rub the wart with a black snail (*Arion niger*), and then hang the snail on a thorn-bush. As the snail wastes, the wart wastes till it is gone.

Kirkmaiden. Rub the wart with the hot blood as it flows from a pig when it is being killed. My informant had seen this done.

Kells. My informant's foot was covered with warts. A pig was being killed. He took off his boot and stocking and held the foot under the blood as it flowed from the animal. Without wiping off the blood, he put on the stocking and boot. The warts disappeared in a short time.

Dalry. Rub the wart with rain-water from a natural hollow in a rock or big stone.

Portlogan. Rub the wart with a halfpenny, tie the halfpenny in a piece of paper, and lay it on a public road. The one who picks it up gets the wart.

Kirkmaiden. My informant saw lately a young woman whose hands were disfigured with wards rub them with a copper coin. It was cast away. The warts in due time vanished.

Kirkmaiden. Cut a potato into nine pieces, rub each wart with each of the nine pieces, then tie up the pieces in a bit of paper and bury the parcel. As the pieces waste, the warts waste. My informant has done this.—*Fourth Report of the Committee on the Ethnographical Survey of the United Kingdom.*

FANTI PERSONAL NAMES.—Among the Fanti negroes of West Africa every one has two names, one taken from the day of the week on which he was born and the other from some personal characteristic of his own, his mother, father, or family. Names such as *Kwesi Ata Kwesi*, the twin; *Kuyo Auan Kuyo*, the fourth son; *Kofi Burónyi Kofi*. from a white man, are very common and exemplify the ordinary method of nomenclature; but the love of parable, which is strong in the Fanti, leads him to give names, dedicatory, as it were, to some fetish, to slaves and waifs and kidnapped children. Among slave children names signifying "The gift of God," "His foot walks straight," "He brought me luck," "From the hand of God," are the rule, and it would be considered of bad augury for them to change.—*Connolly in Jour. Anthrop. Inst. G. B., Nov., 1896.*

HEMENWAY EXPEDITION COLLECTION.—A gallery in the Peabody Museum of American Archeology and Ethnology at Cambridge has been devoted to the large collection of objects made by the Hemenway Expedition in Salado valley, Arizona, and at the ruined villages of Halona and Heshota-u'hla, near Zuñi, New Mexico, in 1887–'89. The expenses of the installation were borne by the estate of Mrs Hemenway, while the excellent arrangement of the objects is due to the efforts of Mr Willoughby, one of Professor Putnam's corps of assistants.

CLIFF-DWELLER COLLECTION.—A collection of 365 specimens from a cliff-dwelling a mile and a half from Farmington, New Mexico, has recently been forwarded to the Carnegie Museum at Pittsburg by Mr Scott N. Morris, a civil engineer.

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Australian Message Sticks.—An aboriginal from Braidwood district, Australia, stated that when it was decided by the king and his advisers to hold a yearin or coroboree a message stick would be sent round to the different camps. A mark cut thus + on the top of the stick, on the front left-hand corner, is called *gouin*, and means "To thee, oh king," and if cut on the bottom of the stick it is called *wongo wong*, and signifies "Make haste, good friends;" and if there are several narrow strips of opossum skin attached to the end it signifies "Everything is ready." The mark S in the center of a message stick about a quarter of the way from the top, on the left-hand side, on the back, is also called *gouin*, and is cut on by the receiver, who returns it to the sender by the messenger who brought it. After the yearin or coroboree is over and if all part good friends, the message stick has the mark + on the left-hand corner of the back of it, which is called *wang wing*, and signifies "We part good friends." When a *bora* ceremony is to be held the mark × is cut in the center of the message stick, which is called *bunnon*, and signifies "We are going to have *bora*." From the statements of this aboriginal it would appear that the position of the marks on the message stick has a great deal to do with its meaning or signification, for the mark +, when cut in different places on the message stick, has four distinct names and significations, as above shown.—*Australasian Anthropological Journal.*

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THE LANGUAGE USED IN TALKING TO DOMESTIC ANIMALS

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INTRODUCTION

The driver who stops his horses by crying *whoa!*; the teamster who directs his oxen to the right or to the left by the terms *gee* and *haw*; the farmer's lad who calls the scattered cattle *boss, boss, come boss*, or the timid sheep with the musical *ko-nanny, ko-nanny* and the grunting hogs with the prolonged *chēē-ōō-ōō*; the playful child who calls her pet *puss, puss*, and drives it away with *scat!*; the farmer's wife who calls to feed the peeping chickens and clucking hens with *coo-chee, coo-chee*, afford familiar illustrations of a language having peculiar characteristics. The words of this language are chiefly monosyllabic and dissyllabic, and are generally repeated in groups of three; although entirely devoid of grammar, consisting exclusively of exclamations and words in the imperative mood, and although, with few exceptions, the words are omitted by the most comprehensive dictionaries, the language serves as a ready and sufficient means of communication between man and the many races of animals under his subjection. This language has but little in common with that used by the animals themselves. The hen clucks, the duck quacks, the dog says *bow-wow*, the cat *meow*, the horse neighs, the ass brays, and the sheep cries *baa*; but man, in responding, does not confine himself to imitations of these dialects of the several races; he forces upon them original sounds better adapted to his own vocal organs, and by constant repetition compels their comprehension.

An interesting feature of this language is, that while the custom of talking to animals obtains throughout the civilized and uncivilized world, the terms used in different countries in addressing a given race of animals vary greatly. This does not, however, prevent the animals reared under diverse conditions from understanding their masters, thus showing the superior intelligence of the animals. Cattle in the field will answer to the call *sake, sake*, in Connecticut, as readily as their cousins will respond to *koeb, koeb*, in Maine, *cusha*, in Scotland, and *tloñ, tloñ*, in Russia.

The Scotch dairymaid sings to the kine *pooh-leddie*, the French peasant urges on his team with a guttural *hue*, the German bauer stops his horse with the sound *brrrr*, the Russian serf summons his chickens with *tsupp, tsupp*, the Egyptian donkey-boy urges forward the donkey by the ceaseless cry, *āāā, āāā*, the Bedouin camel-driver makes his animal kneel by a guttural throat-noise incapable of representation in Roman letters, and yet each animal shows evidence of intelligence by obeying the wishes of his master.

In thus controlling the actions of domestic animals by the voice, man makes comparatively little use of that language with which he is wont to communicate with his fellow-creatures, and employs a peculiar vocabulary supposed to be better adapted to the comprehension of his dumb, though by no means deaf, slaves. Feeling a difficulty in making himself understood, man tries to lower his language to the level of animal intelligence somewhat in the same way that young mothers resort to that preposterous travesty of speech known as "baby-talk." Why infants and domestic animals are supposed to understand inarticulate sounds better than ordinary speech is difficult to explain; perhaps, however, as Bossuet wrote: "Les oreilles sont flattées par la cadence et l'arrangement des paroles."

Man pays an unconscious tribute to the intelligence of his faithful companion, the dog, by addressing him with words of ordinary speech; but in commanding the movements of the other domestic animals—horses, cattle, sheep, swine, poultry, etc—he employs a variety of singular terms never used in speaking to his fellows; these comprise inarticulate sounds and musical calls, besides whistling, chirping, clicking, and other sounds not easily represented by any combination of letters of the English alphabet, nor by musical notation.

I have said the dog is treated with exceptional dignity by man, but the Orientals confer with their camels and horses in strains of affection that are astonishing; the Arabic word *gamel*, camel, signifies "beauty," and the Bedouins become strongly attached to their useful, though ungainly, ill-tempered beasts of burden. The Tartars live in close companionship with their horses, talking to them as freely as if every sentence would be appreciated. When they wish to encourage the animals they whistle to them as if they were birds; when the horses do not travel well the Tartars address them with gentle reproaches; and to stimulate them to special efforts they say to them: "Come, my doves, you know you must go up there; courage, my pets, come, go on." And when the difficulty is surmounted they praise and caress the animals like much-loved pets.

Bulgarians, Bosnians, and Servians are said to speak in most endearing terms to their horses at one moment and to beat their wives unmercifully the next.

I have read that in northern India the natives "carry on long conversations with their bullocks, which consist chiefly in abuse of their female relations," but I am in doubt whether the pronoun preceding "relations" refers to the natives or to the bullocks.

When the isolated Hawaiian Islands were discovered by Europeans the natives had no domestic animals except swine and dogs, and when sheep, goats, cows, asses, and horses were introduced from England, the expressions used in controlling them were imported also, and to this day the Hawaiians employ English terms for these animals.

To what extent speechless animals comprehend individual words and sentences is an interesting question, which does not fall within the scope of this essay; but we suppose the entire phrase is regarded by the animal as a symbol, and we believe that frequently the accompanying tones of the voice, expressions of the face, and gestures of the hand—precursors of the lash—are more significant than the words themselves.

Horses, dogs, and cats, and to some extent dairy cattle, receive individual names, and it is certain that the animals recognize their own names when called. Nor is it necessary to point to animals highly trained for public exhibitions to confirm this; the hostlers and the farmers in every country have pet names for their four-footed friends, to which they respond.

The names used for animals are sometimes imitations of the voices uttered by the animals themselves; these names survive in the speech of children, and thus we have *moo-cow*, *baa lamb*, *bow-wow*, *gobble gobble*, and similar expressions. This origin of names is especially common (so far as English is concerned) with birds; thus we have cuckoo, whip-poor-will, bobolink, bob-white, and is not without an example in the insect-world, as instanced by the katy-did.

Semi-civilized people rely to a large extent on their power of mimicking the notes of birds for success in securing them for food. In British Guiana the Indian name for a bird is almost always an imitation of its cry (Everard im Thurn, Among the Indians of Guiana, London, 1883).

In some countries the calls to animals, as well as their names, are also imitations of the sounds made by the animals. Mr Ferdinand Baer, of Piep, Esthonia, Russia, whose voluminous correspondence has been of great value, sends me a list of the invitation-calls used in Russia. The similarity is not so marked to Anglo-Saxon ears as it probably is to Russian. Cows are called *myk*, *myk;* hens, *tjuk-tjur*, *jur juk;* geese, *gaga*, *gaga;* turkeys, *scheldy-baldy;* horses, *igogo;* sheep, *bebe*, *bebe;* goats, *stuki-bryki*, and hogs, *wiki*, *wiki*. [The letters in these terms should be pronounced as in German.] These words are also used by children to designate the animals. This identity of calls for animals and their child-names is very general. The most familiar home example is *puss*. Ernest Goepfert, writing of the dialect spoken in the Saxon Erzgebirge, gives the following list of calls to animals and their corresponding nicknames used by children. The roots of the words, he says, are unknown.

Animal.	*Nickname.*	*Call.*
Cow	mûtschl	mûtschl, mûtsch.
Goat	hâpl	hâpl, hâp, hâp.
Pig	boschl	boschl, bosch, bosch.
Cat	mîzl	miz, hiz, hiz.
Goose	lîwl	liwl, lib, lib.
Chicken	zipl	zipl, zip, zip.
Hen	butl	butl, but, but.

Conjecture as to the antiquity of the use of the voice in controlling domestic animals carries one back to that scene in the Garden of Eden where "Adam gave names to all the cattle, and to the fowl of the air, and to every beast of the field," "and whatsoever Adam called every living creature, that was the name thereof" (Gen., II). We imagine also that Noah and his children, when assembling the animals by sevens and by twos in the Ark, found abundant scope for ingenuity in devising names for the cattle, the fowl, and for "every creeping thing of the earth after his kind" (Gen., VII).

That the earliest calls were the names of the animals themselves cannot be disputed, and is illustrated by survivals of ancient Eastern names in some common cries used in the United States. The New England lad who calls the cattle morning and night, *koh*, *koh*, or the prattling child who calls its pet *puss*, *puss*, little think that they are using Oriental (Persian ?) words for cow and cat respectively.

Occasional references in early literature prove the antiquity of this language. Theocritus, who wrote his poems about 270 B. C., often uses the word *σίττα* (before a vowel *σίττ᾽*), for driving forward or chasing away goats, sheep, and cattle, when writing of the Sicilian peasants. The old lexicographers give as other forms of the word *ψίττα* and *ψύττα*. Fritsche, one of the chief authorities on Theocritus, says the herdsmen in Greece still use this word.

Homer, in the Odyssey (IX, 315), represents the Cyclops as driving his flocks, *ῥοίζῳ*, with a whistling or whirring sound. This word is onomatopoetic, and is also used for the whistling of an arrow or the whirring of wind. It would seem, therefore, that Cyclops used some inarticulate sound, common in driving flocks, containing the rough *r* sound, combined with a hissing one.

Xenophon's Horsemanship was hastily examined, but apparently contains nothing to the point.

As already stated, a large number of the sounds used by man are incapable of representation by any combination of letters of the English alphabet, and I have adopted in some familiar instances groups of letters intended to symbolize these inarticulate sounds. Though entirely arbitrary, these bear some relation to the normal sounds of the letters composing them, and will serve at least to suggest the otherwise inexpressible calls.

Visible Speech

Professor Alexander Melville Bell has invented a system of notation by which it is possible to represent in ink, on paper, any sound of which the human voice is capable. This is called "Visible Speech," and the fundamental principles of the system are as follows:

> "All relations of sound are symbolized by relations of form. Each organ and each mode of organic action concerned in the production or modification of sound has its appropriate symbol, and all sounds of the same nature produced at different parts of the mouth are represented by a single symbol turned in a direction corresponding to the organic position." (Visible Speech, the Science of Universal Alphabetics, by Alex. Melville Bell, London, 1867.)

Part of the Alphabet

(= part of the mouth contracted:
(back, ⌒ front, ◡ point of tongue,) lips.
| = shutter, sometimes joined to (.

∝ = mixer.

Λ = force-director (close); V (open).

> = breath-director.

⌇ = vibrator or trill.

ϕ = holder.

• = stop.

By combining these symbols the position of the different parts of the mouth, the manner of expelling or inhaling the air, and the peculiar character of the sound to be produced are indicated with such perfect accuracy that any one conversant with Professor Bell's system can reproduce at will the sound represented to the eye.

In the following table the arbitrary symbols I have selected to designate the sounds described are placed side by side with the notation of visible speech.[1]

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[1] A similar table comprising the symbols adopted by Dr Henry Sweet could be arranged by those familiar with his system of phonetics.

Inarticulate Sounds expressed in Melville Bell's Notation

xlk............	Ʊ ᵘ ⋖	to start horses (United States and elsewhere).
sssss...........	ᘮ ɨ ɨ	grooms in England; also to start horses in Mexico.
szszsz...	Ꞷ	to start camels (Egypt).
sh sh..........	Ω ɨ ɨ	to quiet horses and make them hold back (United States).
psp............	DƆɅ ɨ ⋖	to start horses (United States).
bma...........	DɅɅ⋖	to start horses (South India).
brrrr	Ð ω ζ	to start (and stop) horses (Germany).
ppp-oo-leddie...	D ζ ɨ *leddie*,	to drive dairy cattle (Scotland).
ch ch..........	Ʊ Ω	to call a cat.
psss, psss.	D ᘮ	to call a cat (United States).

The materials for this essay have been collected partly by personal observation in the countries named, partly by questioning natives of eastern and distant lands, and partly by correspondence. Most of the letters were received in response to a printed circular sent to individuals and to reprints of the same in periodicals. The circular appeared in the American, English, French, German, Austrian, Russian, and other European journals, and attracted universal attention. On February 13, 1888, I read a preliminary notice of this study in folklore before the New York Academy of Sciences. Since then the contents of a voluminous correspondence have been arranged in the following pages in as simple a manner as possible, grouping the calls under the animal in question.

In studying the words collected from English sources, but little assistance was obtained from the common English dictionaries. The following works have been, however, consulted; Halliwell's Dictionary of Archaic and Provincial Words (London, 3d ed., 1855, 2 vols.), Hensleigh Wedgewood's Dictionary of English Etymology (London, 1859, 3 vols.), Anne E. Baker's Glossary of Northamptonshire Words and Phrases (London, 1854, 2 vols.), Samuel Pegge's Anecdotes of the English Language (London, 1803), and James Britten's Old Country and Farming Words (London, 1880). Besides these, dictionaries of the dialects current in certain parts of central Europe have proved valuable. For a painstaking summary of some of these I am indebted to Prof. Hanns Oertel.

In a very few cases only have attempts been made to trace the etymology or affinities of the words. I have thought it advisable to refrain from following this "dangerously fascinating pursuit" for fear of "eating insane roots that take the reason prisoner." Besides, the object in view has been to collect material as a study in folklore and to leave the derivations to expert philologists. Rudolph Kleinpaul, in his "Sprache ohne Wörte" (1888), remarks: "The commands which we give to animals seem to be more closely related to the primitive ideal language than the *Sprache ohne Wörte*, but we do not know their etymologies."

So far as possible the English expressions are spelled phonetically, though the language as commonly written is not well adapted for the purpose. Correspondents often spelled a given sound in very diverse ways, though each attempted to represent to the eyes that perceived by the ears. For example. four persons writing from different parts of New England reported a certain call to horses in the field thus:

Co-jack, *Cud-ja*, *Kuh-jok*, *Cu-jock;*

and, although these appear very different to the eyes, if spoken quickly with appropriate emphasis they will seem much alike to the ears.

Expressions used in European and Eastern lands are spelled as given by correspondents. In general it must be remembered that the vowels in words of foreign languages have the Italian sound. In some instances the equivalents in English have been added.

Some of the terms used in talking to animals may be peculiar to the person reporting them, and therefore unknown to others who see these pages. Whenever possible I have taken pains to obtain the testimony of more than one person before recording an item.

In the United States, which receive from Europe immigrants of every nationality, one hears on isolated farms where green hands are employed the calls to animals in the field which were used in the old country; and it is not a little discouraging to our claims of superior intellect to find that the four-footed animals learn to respond to the calls in German, Swedish, or

Polish far more quickly than man would do under analogous conditions.

I. LANGUAGE USED IN ADDRESSING DOGS

The superior intelligence of dogs and their constant close companionship with man enable them to comprehend the ordinary forms of speech to a surprising extent. The words used often acquire a special significance, being adapted to secure definite action on the part of the animal under training.

English literature at an early period contains many allusions to the terms used in controlling dogs. Halliwell quotes the following hunting cry to dogs:

> "Thai halowyd there howndys with *how*
> In holtis herde I never soche hew."
> (*MS. Douce 302, f. 34.*)

The same authority gives another cry in hunting:

> "Now is the fox drivin to hole, *hoo* to hym, *hoo!*
> For and he crepe out he wille you all undo."
> (*Excerpta historica, p 279.*)

In Scotland shepherds incite their dogs to pursue sheep by the cry *how-sheep; how* is said to be related to the Islandic *hoa* (Jamieson). Another term, for the same purpose, is thus referred to by Sir Walter Scott: "Little Wasp barks at Dinmount, who cries while half asleep: 'Hoy Yarrow, man far-yaud, far-yaud,' imagining he was calling to his sheep-dog and hounding him" (Guy Mannering, ch. 48).

In the chorus of the famous old hunting song, "A Southerly Wind and a Cloudy Sky," the terms *hoyke* and *hark-forward* are applied to fox-hounds.

> Drag him on, hoyke, wind him, my steady old hound,
> Drag him on, hoyke, wind him, the coverts resound.
>
> Chorus to the next verse.
> Hark-forward, hark-forward, hark-forward, brave boys,
> Hark-forward, hark-forward. Zounds! don't make a noise.
>
> Chorus to the last verse.
> Hark, Drummer, hark, hark, Tuner, hark Tuner,
> He's dodging and jumping at every bush.
> Old Vixen has fastened her tooth in his brush.
> Whoop! tear him, whoop! tear him, he's fairly run down.
> Whoop, tear him, whoop, tear him; give Joe his half crown.

The chorus to a song by O'Keefe contains further exclamations used in controlling fox-hounds:

With a hey, ho, chivy,
Hark-forward, hark-forward, tantivy,
Hark, hark, tantivy,
This day a stag must die.

The chorus in the "Fox Chase" has analogous expressions:

Tally ho, tally ho,
After Renard we go,
While echo on echo
Redoubles the song.

And in the same song occurs the word *yoix:*

Yoix, yoix, tally ho!

In England, trainers of pointers and setters use a number of words having special significance. Thus to cause the dog to lie down the word of command is given, *down*, or, *down-charge*, also *charge;* to come to the masters' heel and remain there the order is, *heel;* to gallop forward, *hold up;* to abstain from taking food placed near, or to stop running in to birds, the peculiar term *toho* is used; to prevent the dogs from breaking fence, the order is *ware fence*, and to come back from chasing cats, poultry, hares, etc, *ware chase;* to prevent the dog from chasing furred animals, the order is *ware fur*, or to stop the chase of birds, *ware feather*. The abbreviation of beware to 'ware is obvious. All these expressions bear out my remarks on the dignified speech used by man toward dogs. Of another character are the common ejaculations *st* to encourage a dog to watchfulness, and *stŭ-boy* to order a dog to seize another animal or a person. *Steady*, *dead bird*, *bring-'em-in*, *hie on* are words of common speech; so is *sick-'em*, a corruption of "seek-him." Jamieson records the term *who-yaud* as used in Lanarkshire to make dogs pursue horses. At the death of the chase, hunters cry, *whoo-up* (Halliwell).

In southern United States almost every hunter has a special language for his own dog, so that the animal will not hunt for any one unfamiliar with the peculiar commands.

Some of the calls for "come here" used by different nationalities sound strangely to Anglo-Saxon ears, but are merely corruptions of the words "come" and "come here" in the given languages. Thus the Cherokee Indians cry *hŭn*, *hŭn*, to call their dogs to the person, *hun* being derived from *h'ani*, meaning "here." In like manner the Polish call *kotschino* simply means "come here."

It is interesting to note that in Bohemia, Denmark, Courland (Russia), and even in Prussia the natives address dogs in the French language, even when otherwise ignorant of it. For example, *allez* = go on; *avant* = start on the chase; *marche* = get away; *apporte* = bring, and *couche* = lie down. In East Prussia *couche* becomes *kusch*, identical in sound, and is used in combination with German, as *kusch-dich* (for couche-toi), "lie down."

The absolute dependence on dogs by the several tribes of the Eskimo race is well known. The natives at Point Barrow urge forward their dog teams with two cries; a man or woman runs before the animals crying *tūlla*, and another man runs behind the team calling *coo*. To call a dog to the person the Eskimo cry *an*, which also means "yes." In ordering dogs they use the third person, saying, for example, "let him lie down" (communicated by Mr John Murdoch).

The Eskimo of Baffin Land cry *yatit*, also *yowksa koksa*, and *hwee* to urge on dogs; to direct them to the right they exclaim *ówa*, *ówa*, *yă-ów*, and to the left, *choia*, *choia*, *yă-choi;* to stop the animals they call *o-o-o-oa* (communicated by Dr Franz Boas).

Mr W. H. Gilder, of New York, who has traveled extensively in the Arctic regions of both hemispheres, sent me an interesting letter, from which I make the following extracts:

> "The Eskimo of North America have no domestic animals except dogs, and in calling them they say: *Hār-hār-hār* in a low tone, pausing a long time between each word, or rather repeating it at intervals as often as necessary to gain the dog's attention and secure his obedience. In the sled there is always one well-trained dog for a leader, one which understands the word of command; but it is at no time a very easy matter to make the animals mind. They are often obstinate or unruly, and about the best a driver can do is to get them to go somewhere near the direction he would have them go. The word of command to the right is *Why-ăh-war-har;* the *ah* is short but strongly accented, as is also the last syllable. To the left is *Ah-rrool*, the first syllable long, the *a* as in far, and the *r* rolled somewhat. The Eskimo use a whip with a handle about 18 inches long and a lash from 18 to 40 feet in length.
>
> "The Indians and the half-breeds, as well as the trappers of the Hudson Bay Company's service generally, have a man to run ahead to lead the dogs where a track has not been broken. If there is a track the dogs

will follow it, but it keeps them up better to be led by a man. The driver constantly calls the dogs by name, or throws pieces of stick at them to keep them at work.

"The Tchoucktchis of Siberia as well as the Russians of Kamtchatka say to their dogs, *tok-tok*, to go to the right, neither syllable accented; to go to the left they say, *năh-năh*, the *a* as in hat. The Tchoucktchis use a stick three or four feet long, shod with iron, terminating in a point, which can be applied as a brake to stop the sled; it usually has some iron rings at the top which jingle when shaken, and urges the dogs to greater exertion, as it reminds them of the skill with which the driver can throw it and hit any dog in his team. The driver recovers the stick without leaving his seat, as the sled glides past on the snow.

"In driving reindeer the animals are guided by a rein and not by the voice. The rein comes back to the driver upon the sled from the base of the antlers of the off animal, and the near one has his halter tied to the antlers of his mate. A steady pull means go the right, and a series of jerks indicate the left. In starting, the driver always leads the team for a few steps, and then they break into a trot, the driver jumping on the sled as it comes past him.

"In driving herds of domestic reindeer the natives contantly shout *Chow-chew*, and it was this expression that the Cossack conquerors of the country heard and finally corrupted into Tchoucktchis (pronounced *chook-chee*).

"The horses in northern Siberia belong to the Yakouts. In driving or riding they guide them with a pair of reins, and urge them forward with the cry, *hut*, *hut*, *hut*, repeated three times as written, the first word in a moderate tone, the second louder, and the third with a very strong accent. In traveling with these people you hear this cry all day. To stop the horses the driver blows his breath forcibly through his lips, which are closed but relaxed, making a peculiar rattling sound difficult to express in writing."

So far Mr Gilder's interesting letter. I suggest symbolizing tke sound alluded to in the last paragraph by the letters *Prrrr*. The items about horses and reindeer are not exactly in place in this section, but it seemed best to preserve the letter as a whole.

In German-speaking countries, besides the French terms already named, the following language is used. To call dogs to feed, *da*, *da*, and *za*, *za*, *zâ* are of much antiquity, occurring in Tristan, thirteenth century (Grimm). A common command used today in East Prussia to urge a dog to seize another one or a person is *fass!* sometimes strengthened by the prefix *alle* (from *allons*); thus, *allefass*. To drive dogs away the word is *willehem*, which is an abbreviation of *will er heim*. Dogs are ordered to lie down, after pointing, by the expression *ti-bo* (tee-bo).

In the Tyrol dogs are summoned to the person with the call *dê*, *dê*, *dâ*, *dâ*, driven off with *huss*, *huss*, and ordered to keep quiet, *unteri*, *gehst hinteri !*

In Denmark dogs are urged to attack a person by the cry *poosss*, or *sook*, *sook*. In Norway dogs are called by the chirp *psp*. In Bulgaria by the cry *kuts-chu*, and driven away by *schit*.

In southern Finland dogs are called by *prisse*, and driven off with *kush*.

In those provinces of Russia on the Baltic where the natives speak the Lettish dialect, dogs are called to the person with *se*, *se*, and *kuts*, *kuts*, or *kutso*, *kutso*, but if they are called to feed, the term is *lak lak*. They are driven off with *sa-lauka sa-lauka* (*lauka* = without). Young puppies, however, are called with *tschu*, *tschu*.

In Illyria dogs are called to the person with *cuka*, *cuca*, and *na*, *na*. They are driven away with *os*, *osa*, and *cuki*, *cuke*. Puppies, however, are called with *ps* and *kuc* and driven off with *sîbe*.

In Poland and the other Russian provinces where Polish is spoken a variety of terms is used to control dogs. They are called to the person by *na*, *tu*, *tu*, *tu*, "tu" meaning "here"; also by *na*, *ty*, *ty*, and by *pojdz tu*. In Podolia the call is *sa*, *tu*, *do*, *nog*. In Lublin the common cry is *nā*, *nā*, *nalū-lū-lū*. Dogs are driven from the person with *a hyj*, *a ciba*, and *a gruz ;* in Lublin with *a-ha*, *pojdzies*.

In urging dogs to attack man and animals the terms vary with the animal to be seized. The general command is *huz go* or *gryz go*, sometimes *pyf ;* to attack hogs, *huzie swe*, also *swi swi ;* to attack geese, *gaz gaz szukaj*, the latter word meaning "seek"; to attack hens, *szukaj kur ;* to attack cattle, *szukaj bydla ;* also *niedaj-ta*, *na-tu-na*, *sa*, *sa*, *sa*.

In the Ruthenian dialect dogs are driven from the person with *atschéebä !*

In Turkey and Greece dogs are ignoble animals, and are spurned by men rather than called. In Greece they are driven off with the cry *hossé*, and urged to attack each other by *too-too-tooré*. In Van, Turkey, they are driven off with *guch* and *osht ;* but Kurds use *werre ;* and the animals are urged to attack each other with *kush*, *kush*, *puss*, and with *ha guee*.

In Spain the common call to dogs to approach the person is *chu-cho* (pronounced tchu-tcho), or *tus-tus ;* from the latter we have the saying: "Á perro viejo no hay tus-tus." It is useless to call *tustus* to an old dog, *i. e.*, "You can't catch an old bird with chaff." In some provinces *tus* becomes *cus*. In the same country they frighten or drive away dogs with the ejaculations *éjé* and *za* (pronounced ayhay and thah).

In Japan the natives call dogs by names given them in consequence of some peculiarity of the individual, as the color of their hair, and if a dog has red hair he is called by the word for red; but foreign dogs are called *kame, kame*, which conveys two meanings—one is "that dog," and the other is "come" (communicated by Mr H. Ichikawa).

In the Zulu language the exclamation *tyi-tyi* is used to set on dogs, and this gives rise to a verb "tyityi zela"—to set on as dogs (Colenso's Zulu-English Dictionary).

Professor Hanns Oertel, to whom I am greatly indebted for voluminous correspondence exhibiting philological erudition, sends me an amusing incident with regard to a term used in South Africa. Herr Joest, writing of his travels in Africa, in 1883, says: "The traveler in South Africa hears daily and hourly the singular word *futsekk*, which means take yourself away! get out! and is used by persons of all nations chiefly to dogs, though occasionally in personal intercourse. This word is so widely and constantly used that an English globe-trotter, after some weeks' sojourn at the Cape, wrote in his journal as follows: 'In Africa all dogs are called *futsekk*, and it is very remarkable that when you call them they always run away.'" Herr Joest points out, however, that *futsekk* is a contraction of the Dutch words "voort, zeg ik"—that is, *Fort, sage ich* (or in English, "Go away, I say").

II. LANGUAGE USED IN ADDRESSING HORSES

a. In the Field

In the United States, parts of England, and other countries where animals are allowed to roam through extensive pastures, instead of being continually confined to the stables, farmers are in the habit of calling in a loud voice to summon the animals from distant points. In the case of cows the relief of milking will generally induce them to come up when called, but horses and other animals require to be fed on arrival, or they will soon cease to respond to the allurement; hence the saying, "You can't catch an old horse with fern, nor an old bird with chaff."

A very common call to horses in the field in both England and the United States is *kōpe*, repeated several times, usually in groups of three—*kope*, *kope*, *kope*. This has been reported from Derbyshire, Shropshire, and many of the southern and western states; its chief variants are *kwope* and *kobe* (one syllable and long ō, as in bold). It is suggested that *kope* is a contraction of "come-up," being shortened for convenience of vocalization.

In New England the farmers cry *cŏ-jack* (also spelled kŭh-jok, cud-ja, etc), which seems to be an abbreviation of "come-jack."[1]

Notes and Queries (5 s., IV, 128) records the cry *hofy*. Creoles in southern Louisiana use the singular expression *see-chuck*, and one correspondent sends from Connecticut the call *bonny*, though this seems more appropriate to rabbits than to horses.

Jacob Grimm, the German philologist, records the calls to horses in his Deutsche Grammatik (III, 308): *füter*, *füt*, *füt* (which is the same as our fodder) and *hüf*, *hüf*; for colts, however, he gives *his*, *his*. This still obtains in Oldenburg, as *hüz*, *hüz* or *heuz*, *huez*, whence the child's name for horse, *hüz-paert* (G. Karl Frommann). In Bavaria horses are called with *ou* and *ouhâ* (Karl Weinhold). In Switzerland horses are called with *co-co*, *co-co*; in the Tyrol with *rossile*, *psché*, *psché*; also with *tschufele*, *tschufele*.

In Hungary the farmers call horses in the field with *csiko*, *ne*, *ne*, *ne* (pronounced tcheeko, nay, nay).

In Bulgaria the call to horses is *jala* (pronounced yālā) and *ela tuka*.

In the Illyrian, spoken in Servia, Bosnia, Slavonia, Dalmatia, Kroatia, etc, horses are called to the person with *gja gja*, *namalna*, and colts with *na*, *tbrz*, *na*; they are driven off with *tbrze*; in Esthonia, by *tucku*, *tucku*.

In the Polish provinces of Russia the terms used to call horses are numerous. In Poland proper the following occur: *ciēs-ciēs*, *scie-scie*, *wi-ha-ha*, *si*, *si*; in Podolia a common call is *kos*, *kon* (kon meaning horse), and colts are called *cios ciou*; in Austrian Poland the call is *füllile*, *zech*, *zech*. Horses are driven from the person by the cry *a wi*, *a wi*, and colts by *sto-ha* and by *hecia*

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[1] See W. H. Carruth, Dialect Notes, part VI, Boston, 1893.

hecka. In Courland (Lettish dialect) colts are called with the words *kusie, kusie* and with *ziga, ziga.*

In Van, Turkey in Asia, horses are called with *purrho* (the *r* rolled with the lips); asses are called with *tscho.*

b. To Start and Hasten Horses in Harness

The terms used to start horses in harness and to urge them to a better appreciation of the value of time comprise vulgar corruptions of ordinary speech and peculiar inarticulate sounds. Throughout England and the United States drivers start their horses by picking up the reins, drawing them gently against the animals' mouths, and exclaiming *go 'long* and *get up;* the latter appears in the forms *get ăp* (*a*, as in hat), *giddap*, and *gee-hup*, or *gee-up.*

> "Huddup, says the Parson,
> And off went they."
> (*One Horse Shay Holmes.*)

A very common way of starting a horse is by a sound which I symbolize with the letters *xlk.* It is a click made by placing the back part of the tongue against the base of the teeth on the inside of the right cheek, drawing in air, and suddenly releasing the tongue.

This click is used for the same purpose by Germans, Poles, Bulgarians, Greeks, Japanese, and by the natives in southern India to *stop* yoked oxen (W. T. Hornaday).

Another inarticulate sound is made by pursing the lips, inhaling air, and suddenly separating them, producing a chirp or bird-like sound. This I symbolize by the letters *psp.* It is especially used by women in the United States.

To start long strings of mules Californians shout *yay*, adding the name of the nigh leading mule.

The Canadian lumbermen cry to their ponies *harighee, harighee*, pronounced quickly. In Montana the American redskins urge forward their pack-horses by calling *yip, yip*, and the Mexicans in the Southwest hasten their burros by *up-ā* and *hy-ā.*

In France, besides the ordinary word *allez* (go on), the drivers cry *hue, huhaut*, and *hurhaut* (Littré); sometimes *hue-donc.* Less common are the exclamations *yeep* and *bi-t-en.*

The Italians hasten horses, oxen, and asses by crying *arri, anda* (from *andare*), and *gio*, this last word coming down from the Latin, as elsewhere noted (Tommaseo, Dizionario . The phrase "*andare gio, gio,*" however, means "to go softly."

In Spain the cries *arre*, *anda*, *alza*, and *chau* are in use, the first named sometimes shortened to *re*, *re* (Velasquez Dict.). The half-breed Spaniards in Mexico start horses with a hiss symbolized by *ss*, *ss*.

In Germany the most common expletive to hasten horses forward is *jüh*, *jüh*, or *hü*, *hü*. Jacob Grimm gives also *hott*, *hotta*, *hotte*, *hottoh*, and *hottjüh*, words used as well for turning the animals to one side.

A sound made by rolling the tongue while gently blowing through the relaxed lips, symbolized by *brrrr*, is used in two opposite ways in different parts of the German Empire, both to start and to stop horses in harness. With the former significance it is used also in Italy. In the Kingdom of Saxony *brrrr* is used to stop horses.

In Switzerland, near Basle, drivers urge forward their teams by crying out *hü*, *hüyo*, *hüpp*, and sometimes add the names of the animals, as *hü Buebe; hü Choli; hü Bigger.*

In the Netherlands and in Austria the exclamation *juh* is used; Bohemia, the analogous term *hy* (pronounced hee); in Denmark, *hyp*, *hyp* (heep), as well as the click; in Norway the sounds symbolized by *psp* and *xlk* are used.

In Norway and Finland the peculiar sound represented by *bma* is employed; this is produced by curling in both lips, pressing them together tightly and drawing in the breath at the moment of opening them suddenly, forming a sound resembling the popping of a cork quickly drawn from a bottle. I have heard native Hawaiians make this same sound for the similar purpose.[1]

In Sweden the drivers cry *ga pa;* in some parts of Russia, *nü*, *nü;* in the Polish provinces of Russia, *wio hio*, *wiu-ha*, and *wi-ha* (w – v), and by the click (*xlk*), as well as by *wio*, *wie*, *hu ano*, and *no*. In the Baltic province of Russia, Esthonia, the cry is *nõõ*, *nõa*, and *tõõ;* in the adjoining province of Courland horses are urged on with *jo*, *no*, and *njo*, and colts with *siks-siks*. When drawing heavy loads the horses are stimulated by the cry *hü*

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[1] Miss Isabella Bird, writing of the Hawaiian islanders, says the drivers urge forward saddle horses with the cry *har-r-rouche*; but this must be a mistake, since there is no *r* in the Hawaiian tongue; the sound is more probably *hal-l-louche*.

hopp or *schüpp*. In Livonia the peasants urge their horses by shouting *nöh* and *näh*.

In Siberia (according to Mr George Kennan) several cries are used to urge on horses, viz, *heck-yā·ā-ā*, *ya-a-a-va*, *and noo-oo-oo*, with falling inflection (compare nü); drivers also cry *ay doorak*, but this simply means "you fool!"

In Bulgaria horses are started by means of the *xlk* (click), common in the United States; also by the term *di-i-i* (pronounced de-e-e); and they are hastened with the cries *tü*, *tü*, and *tschü*, *tschü*.

In Hungary horses are started and urged on with the chirp *psp* and by the call *gyö* (pronounced jee-ö). In the Ruthenian dialect a special click is used, made by suddenly releasing the tip of the tongue from pressing against the base of the upper front teeth, which may be symbolized by *tcht*.

In Greece the click (*xlk*) is used; donkeys are hastened by the cry *ah ah* (nasal intonation), which is also the constant cry of the donkey-boys in Cairo. Another call to donkeys in Greece is *oosi*, *oosi* (J. P. Lotsakos).

In Van, Turkey in Asia, horses are hastened with *dăh dăh* and asses with *chue*. At an interview with Mr Hassan Ben Ali, interpreter for the Moorish Caravan exhibiting in New York in 1888, he gave me the words of command for camels used by natives of his country. To urge on camels the call is *see-ruh*; to keep them in the straight path, *abja-eltregh*, and to make them lie down, *o-tch*; and to hasten horses the drivers cry *ree-yo!* In the *Sooss* dialect of North Africa, however, camels are hastened by another command (incapable of representation here). and are ordered to lie down with the term *merrd*. The camels of the Kirgessen (Siberia) kneel at the command *tschok*.

In Syria donkeys are hastened by the cries *yalla*, or *mâshî*, or *sûk-el-homâr* (Baedeker).

In southern India horses (and bullocks) are started by a sound made by pressing the tongue against the roof of the mouth and then suddenly withdrawing it while inhaling the air, symbolized by *tch*; also by the sound *bma* (described under Norway).

In China, province of Canton, mules are urged with the sound symbolized by *trrr* (rolling the tongue and exhaling); in Japan horses are urged by the *click* and by the cry *do*.

c. To Turn Horses in Harness to the Left

A teamster walks on the left-hand side of his pair of horses, calling the one next to him the "nigh" horse and the other one the "off" horse. To turn the team to the left the common expression is *haw* (also spelled hau and hoi), often used in combination as *haw-here*, and to turn them to the right the ordinary term is *gee*. Both of these demand special consideration.

In Chaucer's time the teamsters used to cry *heit* (or hait, hayte, hyte, height, haight):

> "They saw a cart that charged was with hay,
> The which a carter drove forth on his way:
> Depe was the way, for which the carte stode;
> The carter smote and cryde as he were wode,
> *Heit Scot! Heit Brok!* what spare ye for the stones?
> The Fiend, quoth he, you fetch, body and bones."
> (*Chaucer's Friar's Tale.* II.)

> "Harrer, Morelle, is furthe *hyte*
> And let the ploghe stand."
> (*Towneley, Myst*, *p. 9.*)

Hait was used for a long time in Yorkshire. Atkinson says the Swedish *häyt* is exactly equivalent in sound, use, and sense. *Hait* is now replaced by *harve* or *hawve;* the latter form is reported from Yorkshire, Derbyshire, and Nottinghamshire; analogous to this is *half* and *half-back* (Britten).

In the United States *hawve* takes the form *haw*. This word is not found in Bailey's, Latham's, nor Todd-Johnson's dictionaries, but the Encyclopedic Dictionary says it is both transitive and intransitive. It is also spelled *hau* and *hoi*. One lexicographer claims it is related to the Anglo-Saxon *hawian*, meaning "look."

Haw is often used in combination, thus: *who-haw*, which is common in Virginia, and occurs in Massachusetts; also *haw-here*, the here indicating towards the driver. Wedgwood quotes Davis' Magic Staff: "I bestrode the pole behind the cart and with gleeful impatience waited for the driver to cry *Haw buck*, Gee-bright, go'long!" Yoked oxen are often called "buck" and "bright" in America.

Miss Baker, writing of Northamptonshire, says that *haw* commands all the horses in a team to come toward the driver, except the *fore horse.*

The plain-spoken *come agin* is used in Cheshire (James Britten), and this appears as *coom-yeh* in Gloucestershire, and *com'-other* in Northamptonshire. This modification of "come hither" also obtains in Scotland.

A peculiar cry used in Suffolk to direct the fore horse of a team to bear to the left is *whoosh* (Moor's Suffolk Glossary). This seems to persist in the call *who-hysh* reported from Maine.

In Scotland four other commands are recorded by Britten, they are *hie*, *wynd*, *vane*, and *vine*.

In the Hawaiian islands the natives cry *ho* to the horses. The Hawaiian for horse is *lio*.

In France the command is *dia*, a word found in Cotgrave's Dictionary, published in 1673. A correspondent sends me the term *grierrre*. In Italy the ordinary term is *hoi*, which seems to be related to *haw*, but this may be a mere case of "gleich-klang."

In Germany the usual cry to direct horses to the left is *hü*, but I find recorded also the following: *wuisse*, *weiste*, *wist-har*, *har-wist*, *har*, *hoy*, and *hist* or *hust*. *Har* and its opposite *hott* are mentioned by Philander in 1643. Karl Weinhold cites the following old lines:

> "Wer mit Pferden reden wil,
> Darf den Amidis nicht vil.
> *Hotte stoh*, *tschwuid* und *o*!
> Wer es kann mit Fuss und Mund
> Kann der Sprache meisten Grund."

Hotte = right hand and *tschwuid* = left hand, a more common form being *schwade*. Jacob Grimm gives, further, *jist* (Schwab.), *hi* (Austr.), *zohi*, *tschohi*, and *swude* or *schwude*, which he says is "sonderbar." He remarks that these are probably very ancient words of obscure origin.

In the province of Saxony the words for directing horses to the right and left respectively are *hŏt* and *hü*. In some districts *hü* is replaced by *har* or by *schwúdĕ*, whence the phrase:

> "Denotat *hot* dextram sed signat *schwude* sinistram."

This originated with Professor Taubmann, of Wittenberg (*b.* 1565, *d.* 1613), who composed it to satirize his friend, Professor Siber (*b.* 1563, *d.* 1616), who was unable to remember the distinctive commands.

This classical mnemotechny suggests another current in Germany about 1700, and styled "Neu aufgebutzter kurzweiliger Zeitvertreiber":

> "*Wüh* segnes propellit equos,
> *O* detinet illos.
> *Hotta* tenet dextram,
> Servat tibi *füste* sinistram."

In Holstein drivers use the terms *ho* and *hott* to direct their horses to the left and to the right, whence the saying in Platt Deutsch, "*He* wet nig van *Hott* nog van *Ho*," which signifies, "He does not know *hott* from *ho*," *i. e.*, he is an unskilled driver. But in Eiderstädt the phrase is altered to conform to the terms used, "He wet weder Haiz nog Firrig," *haiz* meaning right hand and *firrig* left hand.

A somewhat similar reference occurs in a couplet quoted by Karl Julius Schroer in his "Weihnachtsspiel aus Kremnitz" (1855):

> "Ich weiss mir weder *hund* noch *hard*,
> Bleib mitsamt dir ein gros zhapeta Narr."

In this "hard" = *har*, i. e., left, and "hund" = *hott*, right.

In Switzerland (Basler dialect) horses are directed to the left by *hüst* and *hüüst*.

In Austria the drivers exclaim *wiste* for the same purpose. It is interesting to note that in Austria, as in England, teamsters turn out to the left when they meet, and to the right when one passes another going in the same direction. On the borders of the German and Austrian empires, as near Carlsbad, this leads to confusion and accidents, necessitating signboards near the frontier, directing the attention of those crossing from Germany to the Austrian rule of the road.

> "The rule of the road is a paradox quite,
> For when you are travelling along,
> If you keep to the *left* you'll be sure to be *right*,
> If you keep to the *right* you'll be *wrong*."
> (*Sporting Magazine, September, 1793.*)

In Bohemia horses are directed to the left with *cehy* (horse = "kun"). In the Ruthenian dialect the word is *vishtä*. In Hungary and in Polish Russia it is the similar word *vistà-ho*.

In the Polish provinces of Russia horses are directed to the left with *hetta*, *cie*, *cive*, *ksobie*, besides *wista*.

d. To Turn Horses in Harness to the Right

Opposed to *haw* is the familiar term *gee*. This, too, is an English word of much antiquity. Together with *whoe* it occurs in Thomas Heywood's "Fortune by Land and Sea" (1620—Act ix, sc. 1); "Come, I'll go teach ye *gee* and *whoe*." In the form *gee-ho* (still current) it is found in the "Dialogus Creaturarum," published at Gouda in 1480. It occurs in the story of the milkmaid who kicked down her pail and with it all her hopes of getting rich. In the Latin the word is spelled *gio* (used in Italy today).

The primary meaning of *gee* seems to be to urge horses (and cattle) forward. The term is given this signification only in Bailey's, Latham's, and Wedgwood's dictionaries. At a later period it acquired the additional meaning to move to one side. Jamieson (Scottish Dictionary) defines it thus: to stir, to move faster, to move to one side; and he compares it to the Swedish *gaa* = to budge, to turn around. Pegge, on the other hand, in his "Anecdotes of the English language," says that *gee* is from the imperative *geh* of the German *gehen*, to go, the hard *g* being softened in time to suit the English custom—a very far-fetched derivation.

The original meaning of *gee* has been preserved in the New England saying, "She'll make you *gee*," meaning she will make you act according to her wishes; also in the other idiomatic expression current in New England, a man of push and energy is "one who makes everything *gee*." This is alluded to by Lowell—

> "For John P.
> Robinson, he
> Sez the world 'll go right if he hollers out *gee*."

Gee has replaced in Yorkshire the older expression *rhee* (or *ree*). It occurs in the Micro-cynicon, written in 1599.

> "A base borne issue of a baser syer,
> Bred in a cottage, wandring in the myer,
> With nailed shoes and whipstaffe in his hand,
> Who with a *hey* and *ree* the beasts command."

And in the Joco serious Discourses (p. 29)—

> "Sir lang time he had cast an eye
> At winsome maistris Property,
> But she would neither *hyte* nor *rhee*."

Rhee is now quite obsolete. *Gee* (jee) is used in combination with other syllables, as *gee-ho* (Cheshire), *gee-off* (U. S. A.), and *gee-back* (Warwickshire and Yorkshire).

According to Forby's Norfolk Glossary the cry *whoosh-wo* is current in Norfolk, England. He derives it from the French "gauche," although it is used in directing animals to the right, In Scotland the call is *weesh.*

From Shropshire *heet* is reported; from Northamptonshire. *hait;* from Kent, *gee-woot;* from Gloucestershire, *woot* (Britten); from Hants, *woag;* but these are apparently of local usage. From Scotland we have *hupp*, *haup*, *height*, and *hip* (Britten).

The teamsters in Virginia have a peculiar cry to direct a long string of mules to lean against their trace-chains to the right, *hep-yee-ee-a.* In Georgia drivers cry *yay* for the same purpose.

In Holland the command is *haar*, or *hot;* in Bohemia, *cehy.*

According to the late Professor H. H. Boyesen (who supplied me with the Norwegian terms), words for *haw* and *gee* are wanting in Norway, where oxen are not in common use.

In the Ruthenian dialect the command to direct horses to the right is *haitä.*

In the Tyrol the command is *hott, hott-i.*

In Polish Russia the terms used are similar, *hot; hetta; het, het,* and *hettia. Wista* and *wis* are also reported by correspondents, but this seems to be a mistake, for *wista* is certainly used to direct horses to the left. In the neighborhood of Krakau the term *od-siebie* is current.

e. To Stop Horses

The interjection *whoa* (wo, whoe, and ho), in general use in the United States and England, to command horses to stop short, has been much discussed by lexicographers. A writer in the *Gentleman's Magazine* (LXIX, 659, August, 1799) derives it from the Latin. "Woohe," he says, "is probably a legacy bequeathed to us by our Roman ancestors, precisely a translation of the ancient classical *Ohe!* an interjection strictly confined to bespeaking a pause—rendered by our lexicographers 'Enough, Oh enough!'"

"Ohe jam satis—Ohe Libelle."

Samuel Pegge, Jr, says:

> "Wo is the broad pronunciation of the Danish Ho! a word commanding cessation and desistance.

> "Ho had anciently an honorable attachment to tilts and tournaments, for when the King or president at the combat gave the signal of discontinuance, by throwing down his warder (or baton) the Heralds cried out to the combatants *Ho!* that is, stop."

Pegge compares with this the French *Ho-la*, and quotes passages from Shakespeare and Douglas's Translation of Virgil, where *Ho* is used in the sense of stop. (Pegge, p. 11–16.)

Wedgwood derives *woh* from the Finnish *woh*, used to represent the sound of panting, and claims that "the sense of coming to rest cannot better be signified than by imitating the panting of one who is out of breath from violent exertion."

Halliwell remarks *ho*, or *hoa* demands the cessation of any act, and quotes the following passage from Stanihurst's Description of Ireland (1577, p. 26):

> "Howbeit they would not crie *hoa* here, but sent in post haste some of the covent to Rome."

Professor W. H. Carruth (Dialect Notes, part VI, 1893) suggests that *ho* and *who* are possibly connected with "hold."

The fundamental call *whoa* suffers many changes at the mouth of the common people whose business lies with horses. In Warwickshire, Gloucestershire, and Hants one hears the teamsters cry *way* (wey); the same term with an aspirate prefixed obtains in Virginia, *hway*, and is used in New York State to cause the horses to slow up. In Yorkshire one hears *wo-ho* (Britten), and in Cheshire, *whoi.*

In southern United States the Africans add a syllable, *who-hoosh*, and one correspondent reports the similar *whoa-hish* from Massachusetts.

Besides the familiar *whoa* and its variants, there are other calls of limited usage; Britten records *stand* in Scotland, and I have heard African-Americans say, *hold it.*

A peculiar cry is used by the Mexicans in the southwestern States; *chick-a, chick-a, chick-a,* repeated rapidly. The Navaho and Zuñi Indians stop their donkeys with *chu, chu, chu, chu,* which seems to be related to the Spanish *cho, cho,* used for the same purpose in the Iberian peninsula; *so* and *jo* are also used by the Spanish mule-drivers.

In France the usual command to stop horses is *hau* (pronounced ho), and sometimes *houoi*, as well as *oh la.*

In Germany horses are stopped with the sound symbolized by *prrr*, a term also used in Esthonia, Livonia, and Denmark. In Norway one hears an expletive which may be represented by *pppp*; in Austria the ordinary command is *trrrr*, the tongue being rolled while exhaling. In the Tyrol, however, the word is simply *ô !*

The familiar *hō-ō* is used in Hungary, in Polish Russia, and in the provinces where Ruthenian is spoken; but in the latter region it is often preceded by an explosive sound made by expelling air through the vibrating lips, *poorr-ho*, *poorr* itself being used to direct the animals to slow up.

In Polish Russia, too, the additional sounds *tprr* and *tsss* are used. In Courland *ho-la* is employed to slow the horses. In Finland the sound symbolized by *prrr-o* is used to stop the animal.

In Bulgaria the exclamation is *tschuch* or *vatschito;* the latter is also used to stop oxen.

In Hungary, besides *ho*, one hears *hö* and *brrr*, as in Germany. The horses are caused to slow up with *sh*, *sh*. In the Illyrian dialect the cry is *ôha* and *st*.

In Greece drivers call *oo-oo-si* to direct the horses to slow up.

In northern India the chirp *psp* is employed to stop horses and bullocks.

In Van, Turkey, horses are stopped by the command *shake* and *shu;* asses with *ōsh* or *chosh* (*ch* as in child).

In Arabic-speaking countries horses are stopped with *ōgŭf*, and caused to go slower with *schway*. The calls to donkeys differ from those to horses; *'ala mahlak* and *'ala mahlakum* signify to slow up, and *osbur* to halt, though one hears the donkey-boys of Cairo use also the English word *stop*.

f. OTHER COMMANDS TO HORSES

In England and the United States the simple English word *back* seldom fails of comprehension by horses, whether in harness or only loosely held by a bridle. *Whoa* is often prefixed to it.

Bartlett (Dictionary of Americanisms) reports *whoosh* as used only in Nantucket.

The Pennsylvania Dutch say *hoove-back*.

In the mountain regions of New England some drivers make the sound *sh*, *sh* to command their horses to hold back when going down steep hills.

To quiet horses when nervous, several words are used, as *soh*, *soh*, *hey-boy*, and *sh*, *sh*. Grooms currying horses often keep up a continual hiss for the same purpose. Some persons, however, claim the hiss is merely to prevent inhaling the material removed by the currycomb.

Teamsters and drivers of stage-coaches in the United States sometimes halt their teams, and by a low, prolonged, monotonous whistle suggest micturition. The same usage is reported from Bulgaria.

To make a horse hold up his foot, one pulls at the fetlock and cries *hold-up*, often shortened to *h'lup*.

When burros wander from the trail the Mexicans address them in Spanish, saying, *Donde va?* (Where are you going?) which seems to be comprehended.

In Denmark horses are ordered to back by the terms *set*, *set* or *ryk*, *ryk*. In Bulgaria the command is *girr*, which is the Turkish word for "back."

In the Tyrol the words of command are *hauff z'rugk*, the latter being an abbreviation of "zurück." In Polish Russia the word *masot* ("back") is used, and to quiet horses *heu* (pronounced hoi).

In Russian, horses are quieted by the term *ho*, *ho*, *ho*, said soothingly.

In Switzerland (Aargauer dialect) horses are ordered to back with the cry *tscho*. This is used in combination with *ho*, to signify "stop and back," *tscho-ho*.

[*To be concluded in April number*]

NOTES AND NEWS

RECENT ARCHEOLOGIC FINDS

Iowa.—While engaged in digging a trench near Fairfield, workmen uncovered, at the base of a tree, a block of wood about the size of an ordinary brick, which on being broken open revealed a thin, well-preserved piece of birch bark, on which were a number of pictographs. The outer covering of wood had been thoroughly coated with gum, which apparently had been hardened by burning. The relic doubtless had its origin among the Indians of the Great Lakes, since the variety of birch on the bark of which the inscription is drawn is not indigenous to the locality in which it was unearthed. The object may have been deposited at the place in which it was found by some of the Lake Indians while en route to Indian Territory, about 50 or 60 years ago.

Kentucky.—Two caves, each of a size to make them important, are said to have been found in Kentucky about the middle of February; one is in the Chaplain river bottoms, a few miles southwest from Lawrenceburg, and the other is at the old Ellis place, near Milldale. Both of the caves are reported to contain evidences of former aboriginal occupancy. In the former a number of stone implements were found.

Minnesota.—Seven copper mines which were formerly worked by the Indians of the vicinity have been found near Pigeon river, on the northern shore of Lake Superior, in Cook county, Minnesota, by Captain William P. Spaulding, of Sault Ste Marie, Michigan. As no implements have thus far been found in the pits, it is assumed that the ancient mining was conducted by means of fire and water. Numerous deposits of charcoal have been encountered during the process of excavation. A very large tree stands in one of the pits.

Wisconsin.—An interesting discovery of two animal mounds has been made about two miles from Winona, Minnesota, within the state of Wisconsin. The mounds are about 2½ feet in height, and their outlines are therefore distinctly traceable. One of the mounds bears the outline of a deer, and has the following dimensions: Tail, 26 feet; body, 24 feet long and 19 feet wide; neck, 13 feet long; antlers, 10 feet long and about 8 feet spread; head, 18 feet from end of nose to the antlers, 6 feet 7 inches from neck to foreleg, 18 feet long; hind leg, 19 feet 9 inches long and 7 feet 10 inches wide where the body is joined. The neck of the effigy extends exactly east and west, the head being at the east end. The antlers and nose extend in a line directly north and south, the nose pointing south. Some 50 feet south of the first mound is another, which apparently takes the form of a rat. The tail is very long, extending considerably over 100 feet. The body is about 25 feet long.

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THE LANGUAGE USED IN TALKING TO DOMESTIC ANIMALS—*Concluded*

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III. LANGUAGE USED IN ADDRESSING CATTLE

a. In the Field

> "Cusha, cusha, cusha, calling,
> Ere the early dews were falling."
> (*The High Tide.*)

Jean Ingelow's familiar lines embody a call to cows in the fields prevalent in Scotland; it also obtained in Lincolnshire as early as 1571. It is sometimes used in combination as *cushy-cow*, and has given rise to a term of endearment, *cush-love.* It is found in England as *cushie*, and in Ulster county, New York, as *cush* (pronounced kōōsh). Philologists find the root of this word in the Icelandic *kusa*, *kussa*, or *kusla* to address a cow coaxingly.

In Scotland one hears the terms *prrutchy* and *pruh.* Sir Walter Scott names the latter in his "Heart of Midlothian" (v. 11):

> "Jeanie rejoiced, in the simplicity of her heart, to see her charge once more, and the mute favorites of our heroine, Gowans and the others, acknowledged her presence by lowing, turning around their broad and decent brows, when they heard her well known: *Pruh*, my leddy, *pruh*, my woman."

Prutchy, also spelled *prrshe*, is said to be a survival of the French "Approchez," which, like other French terms, were introduced in the time of Mary Stuart.

Another Scotch call is recorded by Jamieson: "*Hove*, used in calling a cow to be milked, sometimes as *hove-leddy;* anciently in the Lothians this was *prrutchy* and *prutch-leddy*. Hove is evidently meant in the sense of stop, halt" (Scottish Dictionary).

From Warwickshire is reported the call *koup*, which seems to be related to *kope*, current in England and the United States. This word, as already stated under calls to horses, is a contraction of "come up."

> "Come uppe Whitefoot, come uppe Lightfoot,
> Come uppe Jetty, rise and follow
> Jetty to the milking shed."

From Cornwall, England, is reported *trish, trish;* from another part of the west of England *agayt;* from Shropshire *ka-how-up* and *ka-how-oo.*

The calls reported from different States of the Union are equally diverse. In Connecticut I have heard (and used) *sake, sake* (*a* as in cake); in New Jersey, Maryland, Iowa, and elsewhere this takes the form *sook, sook, sookey;* in Virginia and Alabama it becomes *sookow, sookow;* in central Illinois it is *sook-white*[1]; in Maine the call is *koeb;* in Virginia *coo* (Scotch for cow); in Alabama *co-boys* (come boys); in Maryland *co-wench*, which the negroes of Louisiana and Georgia call *quo-wensh.*

A common call in Connecticut is *boss, boss; come boss;* also shortened to *co-boss.* This is also reported from Michigan and Vermont. Its classical origin is obvious. The diminutive *bossie* is used in calling calves.

Some New England farmers call the field cattle with *koh, koh* (sometimes pronounced kof), which is said to be a survival of the ancient Persian koh, meaning cow. It is certainly related to the Danish koe, the Dutch koe, Swedish ko, and German kuh. Calves in New England are called *cub, cubby;* in southern Louisiana among the Acadians, *shikay, shikay.* The Acadians (or "Cajens," as the natives pronounce the word) use *chā, chā* (*a* as in far), to call cattle for feeding. In taking a herd any distance the leading horseman calls *ōō-ōō, ōō-ōō*, meaning "follow."

In the Prussian province of Saxony cows are called from the pasture with *kŭmōtsch, kŭmōtsch, kŭmōtsch kū-ū-ū.* The word kŭmōtsch is often pronounced *kŭm-motsch*, the first syllable of which is undoubtedly "komm," from the verb "kommen," analogous to the English "co" for "come" in *co-boss.* In addressing calves the diminutive *mötschschen* is used.

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[1] *Sook* is also commonly used to call swine. See § v.

Grimm gives *köss*, *köss;* Weinhold, *lo*, *lo;* and *bus*, *busch* for calling calves.

In the Tyrol oxen are called *hou*, *hou!* also *he hi! he he! tschoŭla*, *he*, *he!* sometimes also *busch busch!* Cows are called by a variety of terms, viz, *kuele*, *tscha*, *tscha;* *tschô*, *tschô;* *tschga tschga;* *kös*, *kös;* *kox*, *koux;* *kul*, *kul;* *kus*, *kusele.* And calves, *higerle*, *ge ge ge;* *zügele*, *zügela.*

In Denmark cattle in the field are called by the familiar *bosse*, *bosse* (sometimes combined with *ko*, as *bosse-ko*) and by *kippe kippe*, the latter chiefly to calves; in Norway by the words *kom baana*, which means "come children." In the Ruthenian dialect the call is *tloñ*, *tloñ;* in Bulgaria a peculiar sound made with relaxed lips and represented by the letters *tbbbü;* this is also used to call sheep. In Esthonia the call is *vitsi* and *wissi.*

In the Polish provinces of Russia a variety of terms is used to call cattle: *bys*, *by;* *nā*, *nā*, *jatosia nā;* *biega*, *anuze*, *nuze;* *dgo*, *dgo;* *oha*, and *maly*, *maly*, *mala* (mala = small). The Polish for cow is krowa. In Lettish cows and calves in the field are called by the terms *bbutze* or *bbutzino*, the *b* being rolled when pronounced; also with *gutschu* (guros = cow). In Russian the call to cows is *tpruko* and to calves *tprutja.*

In the Illyrian language cows are called with *ma*, *ma* and *kra*, *vus.*

In Van, Turkish Armenia, cattle are called with *purre purre* (the *r* being a lip vibration). Calves are called with *burje.*

b. Driving Herds of Cattle

In Scotland dairy cows are driven forward with the cry *ppp-ooleddy*, and cattle with *prr-r-ugh*, the exact sounds being difficult to represent with type.

In New England one hears the shout *whay* (away ?), in Maryland *hye*, in Vermont *wo-heesh*, in the western plains from Nebraska to Idaho *hoy.*

Cowboys in the western States, when not swearing at their herds, often sing a kind of monotonous lullaby to engage their attention and to prevent a stampede.

Mexicans and Indians wishing to drive any animals away from their persons cry *ugashee!*

In Spain the cry is *xau* (pronounced hah-oo).

Correspondents in the Polish provinces of Russia send the following words used to drive cattle: *hō*, *hō; a he*, *anō*, *muzia; a scio ha; oha*, *ucha; a dzie-ha; a de hajda*, and to drive cows near Krakau, *a gdzie*, *gdzie*. Calves are driven forward and from the person by the cry *a kec*, *a luszki* (Podolia).

In Lettish cows are driven into their stalls with the command *kur kuhti* (kuhts = stall), and they are driven out with the terms *kura ahra* or *kura lauka;* another authority gives *dusch*, *dusch*. In the Russian language cows are driven by the cry *cylja* (pronounced seelyah).

In the Illyrian tongue cows are driven from the person with *isko*, *usko*, *hao*, and commanded to stand still with *gok* and *luc*. Calves are called *pos*, *voc* and driven off with *odbi*.

In Zululand the natives driving cattle to water shout *tyi*, whence the verb "tyikiza," to drive with the sound *tyi* (Colenso's Zulu-English Dictionary, 1861).

In Van, Turkey, cows and calves are driven with *ōhō* or *hō*, sometimes *wōhō*.

c. Driving Yoked Oxen

To start and hasten yoked oxen the terms used are mainly the same as those recorded in connection with horses. One hears *go long*, *get up*, *steady*, and the like. From Shropshire is reported *hie-up*.

As with horses, the driver of a yoke of oxen walks at the left-hand side and directs them with the same calls, *haw* and *gee*. In Yorkshire *haw* is replaced by *prow* or *prou*, sometimes varied as *prow-in*, meaning in toward the driver (Atkinson). In New England farmers often name their nigh-ox "Buck," and their off-ox "Bright," so one hears the commands *haw-buck* and *gee-bright*.

To turn yoked oxen to the left the following words are used in the places named: *whoa*, *back haw round*, Michigan; *come brad*, Maine; *hock* or *hock-wo-haw*, western Massachusetts.

To turn yoked oxen to the right the almost universal term in England and America is *gee*. Formerly in Yorkshire the teamsters used the term *hop* or *hop-off*. This is the same as the Danish *hop* used to urge a horse, and has given rise to the old saw, "It is usual to cry to a stumbling man or beast hop! hop!" (Kuttner, quoted by Wedgwood).

From Maryland come the terms *wheel* and *trim* to turn oxen to the right.

To quiet a cow while being milked men say *soh*, *soh*, in a low coaxing tone, as in Trowbridge's lines:

> "When to her task the milkmaid goes,
> Soothingly calling
> So, boss, so, boss, so! so! so!"
> (*Evening at the Farm, St. 3.*)

To induce the cow to move her leg into position for milking the command is *hoist* (pronounced hyst).

In the Saxon Erzgebirge yoked cattle are urged forward with *hî*, *hîo;* stopped with *ê* and *ôhâ;* slowed up with *ahôi* and *hôi;* turned to the right with *hot* and to the left with *wist.*

Grimm gives *hott* and *hatt* for Austria, *hot hut* as Platt-Deutsch, *diwo diau*, *di dist*, and *tschoa dist* as Bavarian for directing oxen to the right.

In East Prussia the terms for right and left respectively are *heitsch* and *zä;* in the Austrian Tyrol, *hotta* and *wist*, *wista*, and the team is hastened by the cry *hî* and backed by *hess*, *hess*, *z'rugg!* (abbreviation of zurück).

In Württemberg the command to go on is *hü* or *jü;* to the left, *hot* or *hotü;* to the right, *hüscht;* to halt, *öh* or *öha;* to back, *heuv* or *heuvor.*

To turn oxen to the right in the southern provinces of the Austrian Empire, where there are many languages of Slav affinities, the command is *kokorr he*, and to the left *sa sa kseb ho.*

In Bulgaria the ox-drivers call out *haid* (pronounced height) to start the animals and *tü*, *tü* or *tschü* to hasten them. There are no distinctive words corresponding to "haw" and "gee," but drivers cry *dgjah* in both cases, and strike the ox on that side from which he is to turn, *i. e.*, on the left if he is to go to the right. To send oxen to their places by the wagon-pole when hitching them, the command *hosch* is given.

In Hungary oxen are urged forward by the call *chalis-ho* (pronounced shalee).

In Greece oxen are commanded to go in a contrary direction from that they are taking by the words *o-alléos*, and they are urged to go faster with *oh!* (repeated).

In the Polish provinces of Russia oxen are hastened by the cries *ho*, *ho*, *watch*, *watchaboo*, and by *anu* and *hej.* The yoked pair is directed to the left by the terms *hee*, *sa-sa*, *ocib-kseb*, *ksob*, *bowe-sa*, *cive*, *wista* (also used for horses), *heys*, *sob*, and *kse.* To turn them to the right the commands are *ho*, *hotte ; ods ! ha-cia*, *kseb-ocib*, *ocib-sa ; cza*, *cabe ; hec*, *ec*, *ec*. Yoked oxen are stopped by the vibratory *brrr*, so common in central Europe, and by the following expressions: *scie-ha*, *prrr ; hep*, *scia ; smukaj sie ;* and the plain German command: *steh' sofort.*

In Switzerland oxen are hastened with *hü* or *häj* (Aargau); commanded to go slower with *hor*, and to turn to the left with *hüsht*, to the right with *hot*, and to stand still *óha*.

In the Illyrian language oxen are called with *ma*, *ma*, *volo ;* turned to the left with *ost*, and to the right with *ca ;* backed with *nuj*, *stu*, *znazad*, and commanded to stand still with *jo*, *ja*, *joja*.

In central India and the Deccan yoked bullocks are stopped with the cry *bma*, a sound explained in section II, *b*.

IV. LANGUAGE USED IN ADDRESSING SHEEP AND GOATS

"*Ho ! nanny, ho ! nanny,*
Nanny winna ye bide?
But aye the louder she called nanny
The braider grew the tide."

This stanza records the most widely used English call to sheep in the field. It is reported from New England, Georgia, Maryland, and Virginia. It is sometimes shortened to *nan*, *nan*, and sometimes pronounced *co-nanny*, meaning "come-nanny." In some parts of New England and western New York the farmers cry *k'day*, or *k'dick*, accenting the second syllable.

In Derbyshire, England, the usual call is *hotch*, *hotch*, and in Warwickshire *s'how*.

The Creoles of southern Louisiana, true to their French origin, call *mouton*, *mouton*.

In Texas the Mexican sheep-herders, who are usually Indians with more or less Castilian blood in their veins, have a peculiar cry to attract the attention of the timid sheep without stampeding them, repeating rapidly in a high falsetto *hillo-heello-hillo*. Hearing this the sheep prick up their ears, look in the direction whence comes the sound, and watch ; they then see the gestures made with arms, hats, etc, to indicate the way they should go, and they move along all together in a jog trot. This cry has no effect on cattle, and is not used in talking to them.

The call to sheep in Bavaria is *bez*, *bez* and *le*, *le* (Weinhold); in Prussia it is *hammel* (= sheep); in Denmark *mikke*, also *bääh*, in imitation of their own cry ; in Bohemia *nannanana* (precisely the English *nanny*); in Spain *chee-vy;* in Esthonia and Livonia *utt;* in Greece *tptoja* (j soft); in Finland three terms at least are used to call sheep—*takkona*, *kutu* (Finnish), and *limbi* (Swedish).

In Switzerland (Aargau) the call to sheep is *heli, se, se, se.* In the Austrian Tyrol several words are employed: *rrr, tschoff, tschoff; rrr tschütt, tschütt; legga, legga, horla.*

In Esthonia the cry is *utte, utte;* in Polish Russia *siep, siep prrr*, and the sound symbolized by *brrr*, but in a shrill key. To drive sheep forward the exclamation used is *hej, hej*; in the province of Courland, Russia, Lithuanian shepherds call their sheep with *ait, ait* (aita = sheep), and lambs with *burr, burr;* they are driven into folds with *gitz, gitz;* another authority gives *stig.*

In Illyrian sheep are driven with *bîa be;* lambs are called with *bebo*, and driven off with *terke*, and commanded to leave their mothers with *kit kit*, and *kit, lûc.*

In Van, Turkey, sheep are called with *hŭrr-rr*, the *r* being prolonged and rolled; sometimes *hurr-é* and *é-hurr;* also *o-ho-ho-ho!* To drive them away the peasants shout *yeree, yerree* and *kuss, kuss.* Rams are invited to fight each other with *hull, hull!* Lambs are called with *burr-burr-burr*, the *r* vibrating with a peculiar motion of the lips. The animals are driven with *pŭkh, pŭkh.*

Calls to Goats

The call to goats used in Holland and Germany, *sik* (pronounced seek), is at least two centuries old, for it occurs in an interesting passage found in the curious work of Andreas Gryphius, entitled "Horribilicribifax," published in Breslau without date, but before 1664. The passage is as follows:

Cyrilla: Nu wollet ihr denn auff den Abend kommen?
Sempronius: *Ἀσμένως ποιήσω.*
Cyrilla: Nicht zu Herr Asman, sondern zu Jungfer Coelestinan.
Sempronius: Sic, sic, sic, sic, sic, sic, sic, sic, sic, sic-
Cyrilla: Je Herr ist doch keine Ziege da!

Translation

Cy.: Will you come, then, this evening?
S.: Gladly will I do so!
Cy.: Not to Mr Asman, but to Miss Coelestina.
S.: Sic, sic, sic [etc].
Cy.: But the man is not a goat!

Grimm gives also *hödel, hödel; luzel, luzel; zub, zub; leck, leck;* correspondents in eastern Prussia report *nippel*, and in Saxony *hep, hep.* In Denmark two calls are used—*mads* for the males and *metto* for the females; in Norway the call is *kille;* in Bulgaria *miki-ki-kau.*

In the Austrian Tyrol a number of calls are employed: *tschâ, ges, ges, ges, rrrr, za, za, za; gusile, ge ge ge; gus, gus, gus; pscha, pscha: es es esele; hottile le le; gile, gile; russ, salz salz salz* (salt).

In Illyrian, goats are called with *ve kejsko*, and ordered to stand still when being milked with *tir, tiri.*

In Lettish the call is *giz giz* or *mik, mik.*

In Van, Turkey, goats are called with *e-e*, the *e* slightly aspirated with a guttural *he, he;* also with *kud, kud* and *gud, gud* (kids). The animals are driven away with *yehe-yehe*, and ordered to stop with *dush.*

V. LANGUAGE USED IN ADDRESSING SWINE

The claims made by some persons that hogs are gifted with superior intelligence seem to be supported by the fact that they comprehend an unusually large vocabulary. Witness the following imperfect list of words used in calling swine in England and America:

Tig, tig, tig	Northamptonshire (Baker).
Kiss, kiss, kiss	Hants.
Check	England.
Jack	Cleveland dialect, England.
Pooick, or peuck	Shropshire.
Chooggy	West of England.
Choog, or chook	New England.
Chawk	Maryland.
Chaw-awg	Virginia.
Chee-ōō, ōō ōō, prolonged with musical intonation	Virginia.
Goof	Western New York.
Woots	Pennsylvania (Dutch).
Wuts	Tennessee.
Walk-wo-ooo	Georgia.
Whoop	Georgia.
Whook	Alabama.
Chou	Louisiana.
Piggy, piggy	Connecticut.
Pig-ōō-ēē	Virginia.

Pig-ōō-y	Iowa.
Pig-oo, pig-ee	Georgia.
Gwoop gwoopie	Georgia.
Pee-kō-ō	North Carolina.
Soo-ee	Maryland, Iowa, Louisiana.
Sookey, sookey	Ohio.
Sug, sug	Provincial English.

The last in this list has engaged the serious study of philologists. Wedgwood finds its affinities in the Old High German; *sû*, the German *sau*, the Dutch *soegh*, the Anglo-Saxon *sûgu*, the Danish *suggie*, the Swedish *sugga*, and the Old Norse *syr*, a sow; and another authority finds its root in the Hindu word for pig, *soo'a.*

A correspondent writes me from Courland, Russia, that in Lettish swine are called *zuhka*, and the common call is *zuk.* Grimm records *sug*, and a Swiss philologist states that the word *sugg* is used to call hogs in the neighborhood of Basle.

In Maryland some farmers have private calls for their hogs which are recognized by their own animals only; others use horns to call the swine. Mr W. W. C. writes if he goes to feed his hogs on Sunday not in his working clothes they do not recognize him, and give short grunts of fear, but as he draws near to them they change to gentle grunts of satisfaction.

Returning to central Europe, the philologist Grimm gives also *wuzi*, *wuzi; huss*, *huss*, *da* (Rhine provinces): *hutz* (Swabia)*; hutsh* (Austria), as well as *sug*, *farl sug.* Weinhold records for Bavaria the analogous terms *suck* and *zu*, as well as *huz*, *huz;* and in his Allmannische Grammatik he gives *hatz*, *hatsch*, *häss*, and *hes.*

In the Prussian province of Saxony the call is *kischchen*, or *kŭschchen;* in the island of Rugen the cry is *mutt*, whence the islanders are called "Muttländer." In East Prussia swine are called *kowmei*, or *kownei;* also *tut*, *tut;* little pigs are called *nitschchen;* also *nitsch ferkelschen*, *nitsch!*

In the Austrian Tyrol the calls are *natschele*, *natsch*, *natsch*, and *natsch*, *tschu*, *tschu*, *tschu;* in Switzerland (Aargau), *gus*, *gus*, and *häs*, *häs;* in Bohemia the call to swine is *choo-néek;* in Denmark, *gyss*, *gyss*, and *oeff*, *oeff;* in Bulgaria, *gussi*, *gussi.*

In Finland they call swine *naski* (Wedgwood); in Esthonia, *possa*, *possa nots-o;* in Polish Russia a large number of terms is used, viz, *mali*, *mali*, *maluskie*, *mamalki; maluskie*, *malu*, *malu;*

nit, nit, nitchen; lusi, lusi; lut, lut, lutka; nydki, ny, duszki, nyku, mysiu; tschu; szkon; n'sia malutkie; kuc, kuc, kon; ksuna, ksu; luty, luty; gudzi, the last two being addressed to little pigs. Swine are driven with the cries *a sive-ha; sive, sive; ciu, ciu; a cio, a ciu.*

In Hungary the call to swine is *gucza ne, ne, ne;* in Greece, *tzch* (tongue against base of teeth with nasal intonation).

In the Russian tongue the call to swine is *chrju* (pronounced kryoo).

In Illyrian swine are called with *gic, gic, puj*, and driven with *us, use, ujdo.* But little pigs are called with *pac, ûme*, and driven off with *skike.*

In Spain swine are summoned by the call *chee-ro.*

In the Hawaiian islands, where swine are indigenous, the natives call them thus: *u, u, uka, uka, ci, ci.* The native name for hog is *puaa* (vowels pronounced as in Italian).

Besides the language used in calling the animals, there are "voices wherewith swine are scared" (Cotgrave). *Hou* was current in 1673; *whoo-ee* was used in Northamptonshire, and reappears in Connecticut as *whee. Sty* is reported from Yorkshire, and *tch, tch* from the same place; this symbolizes a sound made by suddenly removing the tongue from pressing the inside of the upper teeth and the forward part of the roof of the mouth, at the same time inhaling gently.

In Courland, the Lettish swineherds drive the animals with *usch, usch.*

VI. LANGUAGE USED IN ADDRESSING CATS

Calling Cats

Puss and *pussy* seem to be well nigh universally used in calling cats and kittens. It is current in Germany, Holland (poes), and Turkey, and the abbreviation *ps-s-s* (sound made by expelling air softly through slightly parted lips, approaching a whistle) is used in Greece. In Switzerland (Aargauer dialect) it takes the form of *büs, büs.* In Bulgaria it becomes *pisi, pisi.* (Bulgarians also use *mitsi, mitsi.*) Some lexicographers claim to find the root of *puss* in Persian (puisje = cat), Kurd, Turkish, Danish, Irish, and Gaelic.[1]

In France cats are generally called *minet* or *minette*, according to the sex. In Switzerland the analogous *minni* and *minno* are used (N. and Q., 5 s., IV, 316). In the Tyrol the call is *minni* and *minne*, as well as *mui*, *mui*, and *mutz*, *mutz*, and *hazi*, *haz*.

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[1] Emil Seytter, "Barnyard Voices," in *Our Animal Friends*, January, 1894.

In Germany one hears cats called with *mis*, *mis* and *miz*, *mize*. Weinhold (Allmannische Gram.) gives *mim*. Grimm (Deutsche Gram.) gives also *minni; minz; mudel; mütz*, *mutz-zi; zitz; gusch; guss; gös*, as well as *pus*.

In Denmark the call is *miss* or *kiss*. The latter is also current in Finland and Russia.

In Esthonia and Livonia the cry to summon cats is *küss* (practically the same as *kiss*), *küsu*, and *küso*. In Courland the Lettish for cat is *kakis*, but the children name the animal *pinzis* and call it with *pinze*. *Kiz* is, however, also in use. In the Illyrian dialect cats are called to the person with *mac*, *mac*, *mic*.

In Polish Russia *puya* is used as equivalent to "kitty," besides the following calls: *kci; kizia*, *ci*, *ci*, *ci*, and *kec*.

In Spain the animals are summoned with *miz* (pronounced meeth).

In Van, Turkey in Asia, cats are called with *pusho*, *push*, in which we note the Oriental root of *puss*.

In Arabic-speaking countries they call cats with *moos*, *moos*.

In Japan cats are called by the word *ko-zo*, *ko-zo*, which means "little priest."

When cats were introduced into the Hawaiian islands the natives heard the English call them *pussy*. Now there is no *s* in the Hawaiian alphabet, and the nearest approach to pussy the aborigines can articulate is *poki;* so one hears the call *poki*, *poki*, *mai*, *mai miao*, "mai" meaning "here." To those unfamiliar with the exigencies of the Hawaiian tongue, *poki* may seem a rather far-fetched translation of pussy, but it is fully as reasonable as the name given by the natives to my friend Judge Hitchcock, who is always called Hiki-koki (pronounced Heekee-kokee).

DRIVING AWAY CATS

To drive cats from the person, *scat!* is the familiar expletive in England and America. Wedgwood records also *cass*.

In Finland the exclamation is *kutis*; in Prussia, *käz* (*kas* in Old German); in Hungary, *tsi;* in the Ruthenian dialect, *a-kotä* (kotä meaning cat); in Illyrian, *pûs*, and *cic* or *sic;* in Bulgarian, *tbus* or *tbubbs;* in Lettish, *skiz* (pronounced skits), also *schkitz* and *kitz;* in Russian, *brys;* in Polish, *psik, a psik,* besides *a kota,* as above.

In Switzerland one hears *chaz!* (guttural *ch*). In Spain the exclamation is *zape!*

VII. LANGUAGE USED IN TALKING TO BIRDS

a. Hawks

The gentle art of falconry, characterized by Washington Irving as "the generous sport of hunting carried into the skies," has given rise to an entire language of its own. Not only do the different classes of hawks receive distinguishing names at various periods of their lives, but peculiar terms are applied to the parts of their bodies, as if wings, legs, and tails were names too common for the noble bird.

The calls used to control their movements, in England, are not numerous. In training young falcons one writer records the cry *hi-away lass* (or boy), *hi-away,* used to induce the bird to approach the falconer, and he naively adds: "If the birds understood English it would be perfect insanity to employ cries which bid departure while they require approach." Another call to fetch the bird to the person is *yo-ho-hup, yohup, yohup.*

To encourage the hawk to attack, falconers cry *au vol* or *a la volée,* also *hooha, ha, ha, ha,* in a shrill tone. When the quarry is killed they cry *whoop* or *who-whoop.*

To make a hawk stop to the lure the cry is *so-hoe* (Halliwell).

Sir Walter Scott, in the "Fair Maid of Perth," writes: "As the bonnet-maker spoke there was heard on the left hand the cry *So, so, waw waw waw,* being the shout of a falconer to his hawk."

A friend sends me another quotation:

> "Then mark the swift hawk,
> See him now take his stoop,
> Down, down, goes the game,
> Call them in, *la leup, la leup.*"
> (*La Leup, or the Gallant Falconer, by M. P. Andrews.*)

b. Poultry

Calling

In spite of the severely critical statement of Earle that "chick is a young and deductive singular derived from the imaginary plural chicken " (Phil. Engl. Tongue), the young fowls respond to the call "chick, chick," very promptly, in hopes of receiving accustomed food. Their range of intelligence, in the United States at least, seems to be limited, for the number of calls reported is small.

In England the calls *chuck*, *chuck*, or *coop*, *coop*, prevail; in Virginia, *coo-che*, *coo-che;* in Pennsylvania, *pee*, *pee.* This latter call is widely employed, being reported from Germany, Spain (as *pi*, *pi*), Bulgaria, Hungary, Bavaria, and the Tyrol. In the Austrian province the term is used in combination, thus: *pulla*, *pi*, *pi;* the call *pullele*, *pul pul*, also occurs there.

In some parts of Germany the poultry are called with *tick*, *tick;* in Prussia, *pŭt*, *pŭt*, and young chickens with *tŭk tŭk* (Grimm) and *schīp*, *schīp*, the latter being an imitation of their own cry. In eastern Prussia hens are called with *kluckschen*, *kluck*, *kluck;* also *tippchen*, *tipp*, *tipp.* Grimm records also *pi*, *pi* and *tiet*, *tiet.* Weinhold reports from Bavaria *bibi*, *bibeli*, *bidli; pi*, *pi*, and *pul*, *pul.*

In Denmark the call is *pootle;* in Holland, *kip*, *kip;* in Bohemia, *tyoo;* in Bulgaria, *tiri*, *tiri.*

In the Ruthenian tongue hens are called *tsupp*, *tsupp;* in Esthonia, *tibu*, *tibu* or *tibbo.* In Polish Russia several cries are employed: *tiu*, *tiu* (also spelled *tju*); *dzib*, *dzib; dziub; dziu*, *duski*, *dziubuchna; kur*, *kur* (*kura* = hen); *kuruchna; cip*, *cip* (*chip* = hen); chickens are called with *chibooken; cipcie*, *cipuchni*, and *czurr*, *r*, *r* (*kurcze* = chicken). In Russian the term is *zyp.* In Lettish, hens are called with *put*, *put; zib*, *zib*, *tik*, *tik*, and *tipp*, *tipp* (or *tib*). The hen in Lettish is "wista," but in child-language *ziba.*

In Switzerland (Basler dialect) hens are called with *bibí*, *bibí.*

In the Illyrian language hens are called with *pîla*, *koko*, and *cuk*, and driven away with *is.* Little chickens, however, are called with *pipi*, *pili*, and *pilo.*

In Greece poultry are called with the click *xlk.*

In Van, Turkey, hens and cocks are called with *juju-juju;* in Madras, with *bo*, *bo*, *bo.*

In the Hawaiian islands the natives cry *ke*, *ke*, *ko*, *ko*, *mai mai mai* = here). In Japan poultry is called with *to to to*, an abbreviation of the word *tori*, meaning "bird."

Driving

"The voices wherewith we drive away Pulleine," in the quaint language of Cotgrave (1673), also vary greatly in divers countries. The most common exclamation in the United States is *shoo*, *shoo*, sometimes spelled *chou* and *shue*. Jamieson considers this related to the German "scheuch en." Grimm gives the same word, spelling it *schû* (M. H. D.); also *huschk* and *tisz*.

In Japan the cry to frighten off fowls is *shi*, *shi;* in Esthonia, *kuis;* in Bulgaria, *kasch* (pronounced kawsh).

In Polish Russia poultry is driven off by the terms *k'schoo*, *kurce*, *ausz* (= out), *a gule*, *a sia*. In Courland Lithuanians cry *tisch tisch* and *tisch lauka*.

In Van, Turkey, hens and cocks are driven with *kush*, *kush*, *kusha*, *kusha*, and they are "invited to fight" with *dig*, *dig*, *dig*.

c. Calls to Ducks

In that marvelous English classic "Lorna Doone" John Ridd's sister Annie visits the duck-pond, and calls *dilly*, *dilly*, *einy*, *einy*, *ducksey*, which Blackmore calls the "national ducks' anthem." *Dilly*, *dilly* is also current in the United States; *diddle* is reported from Virginia, and *widdy* from North Carolina.

In Prussia, ducks are called with *fit*, *fit* (pronounced feet); in Westphalia with *wip*, *wip* (weep); Grimm gives *pile*, *pile* (see Lettish below) *bile*, *bile;* *ant*, *ant* (Austria); *nat*. *nat*, and *lip*, *lip*. Weinhold gives *dis*, *dis*, and *schlick*. In East Prussia the call is *wittchen*, *witt witt*, and the ducks are driven with *kaatsch* (compare the Polish kas).

In Holland the call to ducks is *poele*, *poele* (pronounced pool); in Bohemia, *leedle;* in Denmark, *rap*, *rap*.

In Esthonia the ducks are called with *pülo*, *pülo;* in Polish Russia there are several calls in use: *dzieci* (which simply means "children), *kys*, *kys*, or *kes*, *kes*, *kesiurki*, *herus*, *herus;* and *kas*, *kas kacia;* also *katschooken*. *Tas*, *tas* is also used as in the Ruthenian dialect. (The Polish for duck is kaczka.) Ducks are driven away by the cries *kac*, *kac;* *harus*, *harus*, *herus;* and *a tas*, or *a herus*.

In Lettish a duck is "*pihle*," and the birds are called with *pihl*, *pihl*, and driven away with *nisch*, *nisch*, *lauka*.

In the Illyrian language ducks are called with *pat*, *pat*, and driven off with *pâto;* young ducklings, however, are called with *li*, *li*, or *lig*, *lig*, and driven away with *pâtligo.*

In Ruthenian ducks are called with *tasz*, and in Hungarian with *katch.*

In the Hawaiian islands the natives use the word *kaka*, this being the word for duck.

In the Madras Presidency ducks are called with *bath*, *bath.*

d. CALLS TO GEESE

Geese are called in Cumberland, England, with *yuly*, and in some other shires with *white.*

In Germany they use the terms *wulle*, *hulle*, *rusch* (Grimm), *grus*, and *wes* (Weinhold); in Westphalia, *rir*, and in Prussia, *hūlĕ*, *hūlĕ* (often pronounced *hīlĕ*), and *trile;* also *hösse.*

In Bohemia the call is *husz* (goose = husa), which is also used by those speaking Ruthenian. In Bulgaria the geese are called *pa pa* and *gir*, *gir;* in Hungary, *wurri.* The last word is also used for the same purpose in Switzerland near Basle.

In Polish a goose is *ges*, and a gosling *gaska.* They are called with *cygo*, *cygo;* *pilus*, *pilus*, and *hus*, *hus;* when driven in flocks the cry is *lela*, *lela.* In Courland geese are called with *an*, *an*, or *anit*, or *annin;* also *kâne*, a word of Finnish origin. The word *gusch* is likewise employed, and the philologist Bielenstein, writing of the Lettish tongue, remarks that *gusch* is truly Lettish, and corresponds to *süss* = goose, except that the original guttural of the first part is preserved; compare, for example, *guogas* in north Courland and *kuasch* in Livonia, which means goose (Die Lettische Sprache, Berlin, 1864). In Courland they drive flocks of geese with *ell-ell-ell.*

In the Illyrian geese are called with *gus*, *gus*, *gaz.* and driven with *zug*, *zuga;* the goslings are called with *zug*, *zug*, and driven with *zug*, *guso.*

Geese and ducks are driven forward in Prussia with the exclamation *hutsch*, *hutsch*, and in Russia with *tjagu*, *tjagy.*

e. CALLS TO TURKEYS

In some counties of England the farmers call turkeys with the words *popo*, *popo* (Notes and Queries). In Georgia and Virginia the common call is *pee*, *pee.*

In Bulgaria the peasants cry *mĭnĭ*, *mĭnĭ*. In Polish Russia a number of terms are used: *kur*, *kur*; *trus*, *trus*; *trr*, *trr*, or *tur*, *tur*; *gul*, *gul*, or *gulu gulu*, or *glu*, *glu*, *gulusie*, and *pul*, *pul*.

In the Hawaiian islands the call is *kolo*, *kolo*, *pokeo pokeo*, the native word for turkey being *pelehu*.

In Prussia, hens, ducks, geese, and other barnyard fowl are frightened away with *hŭsch* or *hsch*, and smaller birds, as pigeons, with *brrr*.

VIII. SUNDRY ANIMALS

Ostriches in South Africa are called with the cry *koo-ă*, *koo-ă*.

Doves are called by those who speak Illyrian *vit*, *vit*, and peacocks *bibi bibice*.

Buffaloes in Van, Turkey in Asia, are ordered to lie down with *nukh*; they are called with *ow* and *ŏō*; also *now*; they are driven away with *yĕ* and *yĕ-wo*; when yoked they are driven with *dĕ* or *dĕh*, and they are warned against the attack of another buffalo by the exclamation *woo*, *woo*, *woo* repeated quickly.

Elephants.—G. C. Conklin, elephant-trainer with Barnum and Bailey, gave me the following terms used in controlling elephants: *mile* = to walk; *shy* = to turn from the person; *come in* = to turn toward the person; *tut-steady* = to stop; *tut-back* = to back. Elephants know their names and respond to them when called.

Some animal-trainers use French words almost exclusively.

IX. CONCLUSION

A knowledge of the language used in addressing domestic animals might save travelers some inconvenience; for when horses, for example, are trained to obey a certain command they naturally do so under all circumstances. A correspondent writes: "Driving a kind and gentle horse just purchased, I cried *whoa!* to stop him, but he backed, and the louder I cried *whoa*, the faster he backed, until the carriage was upset and I was thrown out. Then the animal stopped in a moment, having perceived something was wrong. On inquiry of his former master I learned the horse had been trained to back at the cry *whoa!*"

A lady traveling in Norway had a somewhat similar experience; in trying to dismount from a horse she caught her bootnails in the perforated stirrup iron, and while endeavoring to free her foot she cried *whoa!* This British ejaculation had the effect of frightening the little beast, and he set off at full speed, to the lady's discomfiture.

Since the same sound is used in Germany to stop horses as is used in Italy to start them, viz, *brrrr*, it is conceivable that an Italian horse transported to Germany might bolt in response to the Teutonic command to stop. Several reversals of this character have been reported to me; the click, *xlk*, used to start horses in the United States, is employed to stop them in India; the chirp, *psp*, used in the United States to urge horses forward, is used to stop them in South Africa; and the *hue* and *dia* used in France to direct animals to the right and left respectively are said by the lexicographers Mahn, Pictet, and Littré to be employed in the reverse sense in Switzerland.

In the preceding pages an important feature of the language used in talking to animals has been unavoidably omitted. I refer to the musical intonation which gives to each cry a special character having great influence with the animal addressed. In calling a given animal from a distance the cry becomes a loud shout in a shrill key and greatly prolonged, but in speaking to the same animal near at hand the same term is uttered in a soft, low tone and coaxingly.

A study of this very imperfect collection of words used in talking to domestic animals in different parts of the world leads me to the general conclusion that the terms used in calling them are generally corruptions of the ancient names of the animals themselves (sometimes with a prefix as "come"), and that the rest of the language is made up of obsolete expressions originally forming part of ordinary speech in the infancy of its development, which have been preserved through this special usage, together with inarticulate sounds and calls having their origin in the attempt of man to lower language to the comprehension of the domesticated animals, and to imitate their own cries. All these words are subject to the same influences that lead to the development of dialects, thus producing transformations not easily traced; moreover, these changes are quite radical, inasmuch as the language is unwritten, and is perpetuated only by the *lore* of the *folk*.

PRIMITIVE ROPE-MAKING IN MEXICO

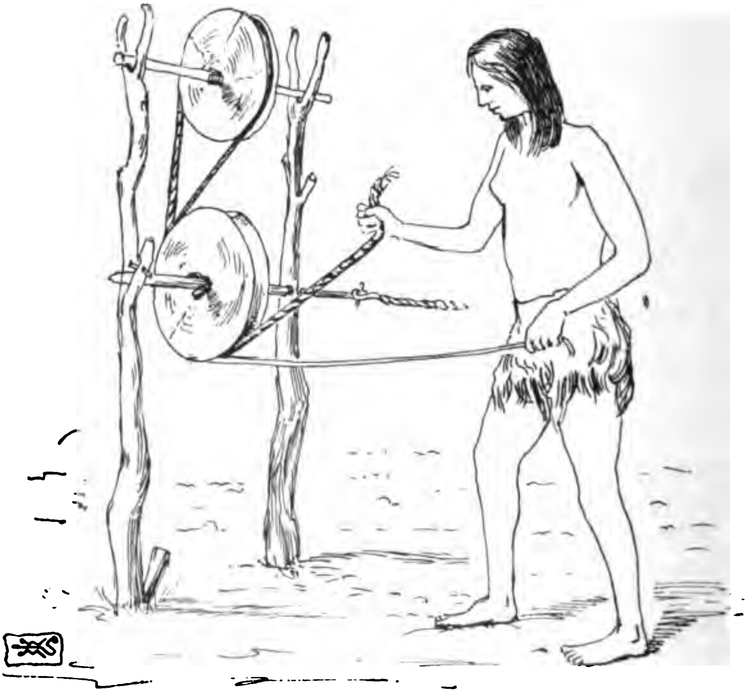
W J MCGEE

Some seventy-five miles east of the ancient mining town of Catorce and twenty-five miles east of the village of Doctor Arroyo (or Valle Purissima) lies a valley skirting the western base of the eastern Sierra Madre of Mexico. This, like neighboring valleys, is partly occupied by Mexican rancheros, whose feudal haciendas are centers of dependent population, chiefly native. One of these haciendas lies midway between Doctor Arroyo and the mountain-bound hamlet of Miquihuana; it is crossed by the Tropic of Cancer, near the meeting point of the three states of Tamaulipas, Nuevo Leon, and San Luis Potosi, and is a three days' mule trip southwest of Victoria, capital of the first-named state. The scant population is of the customary mixed character; estimated roughly, a half or two-thirds of the individuals are Spanish-Indian, the remainder pure Indian; there may be half a dozen pure blood Spaniards in as many valleys; and the aggregate blood is probably three-fourths or four-fifths Indian. The Indians probably belong to the Guachichil group of the Nahuatlan stock.

With one exception, the chief industries are agriculture and stock-raising, both conducted in a small and rather sporadic way, under the direction of the patriarchal dons of the haciendas, aided sometimes in part by a tributary yeomanry, always in chief measure by an Indian peasantry—peons before Diaz, and little more than nominally elevated above that condition today. The industrial methods are largely aboriginal, since the Spaniard assimilated most things native instead of displacing them like the Anglo-Saxon; the silver mine at near-by Matehuala was put down two hundred meters without the use of pick or shovel, drill or explosive, by native miners under Spanish and American superintendence; and the agricultural methods are equally unlike those familiar to los Americanos. The exceptional—and principal—industry is still more purely native; it is the harvesting of a crop never cultivated or even planted. This crop is taken annually from a fiber-yielding agave, related to sisal, known locally as lechuguilla. The plant grows in bunches or tufts sparsely scattered over the foothill slopes; the harvest is gathered by solitary and wide-wandering Indians, provided commonly with machete for use as knife and heckle, sometimes only with implements of stone. Each adult harvester has a weekly stint of seventy-five pounds of clean fiber, which he exchanges at the hacienda for corn and manta, the customary food and wear of the peasantry, with now and then a few centavos or reales to be expended for lethal mescal, staked on the Sunday cock-fight or dissipated in gambling. The fiber is carefully stored by "el Patron," in the original sheaves or bundles until a quantity is accumulated, then packed on burro trains to the nearest seaport or railway station, whence it is shipped under the name of ixtli; its ultimate destination is vaguely supposed by the rancheros to be Liverpool, where it is probably transformed into sisal cordage. This fiber is the chief commercial product of the district.

While the greater part of the ixtli is exported, a portion is used locally in making cordage and a variety of coarse fabrics, especially pack-ropes, riatas, and other equine appurtenances, together with smaller cords used in thatching roofs and walls with the stipes and bast of a yucca, here developed into a lofty and wide-branched tree. With this use of the fiber a highly developed art of rope-making has grown up, and there are usually two or three rope walks on each extensive hacienda. It is uncertain whether the art is strictly aboriginal or essentially accultural, though it is certainly primitive, and the most skillful ropemakers are either Indians or Mexicans of predominantly Indian blood.

The typical rope walk is merely a well-trodden path, perhaps a hundred feet long, from which the greasewood and other shrubbery have been cleared, with a simple device at one end for converting alternating reciprocal motion into the continuous and uniform rotary motion required to twist the rope. This device is of interest partly because of its simplicity and effectiveness, partly because it seems not to have been recognized hitherto by students of technology. The mechanism consists of two wooden pulleys or sheaves, mounted one above the other in about the same plane, on wooden shafts supported by upright posts set in the ground, together with a strap or harness (a rope six or eight feet long) laid over the upper pulley and bent under the lower; the ends of this strap being grasped and alternately pulled by the right and left hands respectively of the operator—usually a half-grown girl. The shaft of the lower pulley is prolonged in the line of the rope walk, and the initial loop of the rope is simply laid over its tip and fastened with a wooden pin. The entire apparatus is rude, being hewn out of mesquite and ironwood and put together with no other tools than machete, ax, and awl. It is represented in the accompanying figure, drawn by Mr Wells M. Sawyer from oral description. Within reasonable limits the dimensions are immaterial and determined by convenience of the maker, though commonly the lower pulley is the larger and the more carefully rounded. The average dimensions may be, for the upper pulley twelve inches in diameter by two inches in thickness, and for the lower fifteen inches in diameter and two and a half inches in thickness; the groove in the upper pulley is commonly V-shape, and that in the lower U-shape and sufficiently broad to accommodate easily both strap ends. In none of the observed cases were the pulleys turned; they were simply



rounded by the eye, and subsequently squared and centered on the shafts by means of wooden wedges driven into the rudely chopped eyes.

The operation of the apparatus is simple and easy in appearance, though actually it requires a sleight gained only by considerable experience. To illustrate it more clearly, the strap in the illustration is drawn with a taper. Neglecting the initial or starting manipulation, it is as follows: The left-hand end of the strap is slackened, perhaps so far as to fall away from the lower pulley, while the right-hand end is pulled strongly and steadily; the weight of the slack end gives the central part of the strap a moderate frictional hold on the upper pulley and a still better hold on the lower, which accordingly rotates at the rate of pull. At the end of this pull (ordinarily about thirty inches) the right-hand end is cast quite slack, while the left-hand end is pulled steadily; this gives a slight frictional hold on the upper pulley, which gradually checks its momentum and motion, meantime giving the requisite frictional hold on the lower pulley to rotate it at the rate of pulling. At the end of this pull the first movement is repeated, and so on indefinitely. The effect, under the manipulation of a skillful operator, is to give uniform rotary motion to the lower pulley, while the motion of the upper pulley is irregular, ranging from a rate corresponding with that of the lower to a slight reverse rotation about the end of each left-hand pull. The solid wooden pulleys are of course sufficiently heavy to act as balance wheels, and it is probable that the elasticity of the whole mechanism, including the incipient rope in the hands of the rope-maker, contributes toward the steadiness of motion.

The mechanism is modified somewhat by different rope-makers—indeed, no two are exactly alike in form and dimensions. In some cases the two pulleys are of approximately equal size, while in others the lower is much the larger. Again, the rude axles may be made thick, one or both, when the driving strap may be laid over and bent under the axles beside the pulleys, which then serve merely as balance wheels; while the most skillful rope-makers use a double machine, in which another shaft (perhaps carrying a balance wheel) corresponding to the lower is mounted just behind it, the two shafts being connected by means of a rope belt in such manner that their motion corresponds as exactly as the rude mechanical construction permits.

Distant observations indicated that the harness also is modified somewhat by different operators.

The work of the rope-maker also looks simple, though it requires a sleight only to be developed through years of experience, particularly when two strands are twisted at the same time. Taking a truss (or large armful) of fiber, which he supports with the left hand, he with his right hand doubles a wisp over each of the shaft ends and fastens them by means of the pins, allowing the ends of the wisps to lie in contact with the truss; then the operator starts the machine, while at the same instant the rope-maker moves backward at such rate as to permit the squirming wisps to lay hold of just the requisite quantity of fiber in the bundle; he continues backing away, using his right hand to aid the incipient rope in selecting fiber when necessary (though if he is skillful this necessity rarely arises) and to help his left in raising, lowering, and slightly turning the truss as the twisting strands creep about gathering material, until the last handful of fiber is consumed and he is at the end of the walk. He then has two strands of astonishingly uniform size, say a fifth or a quarter of an inch in diameter, according to the size of the projected rope; holding one in either hand, while the operator continues driving the machine, he gradually tightens the twist, giving a tremulous or wavy motion to the strands in order that the tension may be equalized from end to end; at length the two are brought together and allowed to intertwist at a rate controlled by the strength of his pull, the driving machine being kept in operation, and the twist, as before, being equalized by an undulatory movement; finally the machine is stopped, the operator takes off the loops and brings them together, and the two-strand cord is done. These cords are commonly doubled to form four-strand ropes. When a single machine is used, an assistant is required, either to help take off the first strand while a second is made, or else to hold the center of the single strand while it is doubled by the rope-maker, who returns to the machine to complete the operation; the rope walk in the latter case including additional paths. The ropes made by the single machine are generally inferior to those of the double apparatus, though three-strand cordage is sometimes made on the former.

The greater part of the product of these primitive rope walks is used locally, but some of the better ropes are exported into neighboring districts, at least as far westward as the Mexican National railway.

The observations herein recorded were made in the autumn of 1891, during an extension of a geologic excursion through the southern states. The party in the portion of Mexico described comprised R. T. Hill, of the United States Geological Survey; Anita Newcomb McGee, M. D., A. C. Truehart, of San Antonio, and the writer. The customary hospitality of Mexico—the graceful compound of Castilian courtesy with aboriginal communality—was enjoyed by the party at Doctor Arroyo, at Miquihuana, where no white woman, and Bustamante, where no white man was ever seen before in the memory of the elders, and especially at Hacienda el Carmen, the principal center of ixtli-gathering and rope-making in the lechuguilla (*Agave heterocantha*) district.

BOOK REVIEWS

The Biological Problem of Today. By Professor Dr Oscar Hertwig, Director of the Second Anatomical Institute of the University of Berlin. Authorized translation by P. Chalmers Mitchell, M. A. The Macmillan Co., New York. Price, $1.25.

This is a translation of Hertwig's "Präformation oder Epigenese," the tract in which the most celebrated embryologist of Germany examines and discusses the theory of Weismann upon cell development and heredity.

This theory owes its force to the fact that it involves certain hypotheses of cell structure suggested by the atomic theory of chemistry. As the latter supposes matter to be composed of atoms aggregated into molecules that give it its physical characters, so Weismann conceives that protoplasm is composed of aggregations of a still higher order, of biologic units or *biophores*, each of which has a complicated but definite molecular constitution that produces the special phenomena of cell activity. To account for the specialization of cells, he holds that each special kind contains a group of groups of biophores peculiar to itself. These groups he calls *determinants*, since they determine the special character of each class of cells. To account for hereditary transmission, he assumes that certain portions of the ovum and spermatozoon contain groups of determinants from all parts of the body, and that these are associated into groups of a higher order termed *ids*. These collectively constitute the *germ-plasm*, which he holds is transmitted practically unchanged from generation to generation. It is, in fact, the old theory of encasement or preformation reappearing in a new dress.

Hertwig holds that while there is reason to believe that protoplasm is made up of certain highly complicated units corresponding in the main to the biophores, as indeed had previously been surmised by Nägeli and De Vries, the further assumptions of Weismann are not warranted by what we know of biological phenomena. The entire ovum is not necessary for the formation of an entire individual, as assumed by his hypothesis, for both Hertwig's and Wilson's experiments show that by shaking apart the segmentation spheres (in Amphioxus) formed in the division of the ovum two embryos may be developed, each perfect, but smaller than usual.

Many considerations are brought forward to show that the development of cells depends largely upon external stimuli rather than upon some mysterious internal group of specially arranged particles. The formation of galls and experiments with frogs' eggs seem to show this conclusively.

Space will not permit a detailed examination of this interesting subject, which is of the highest importance in all biological sciences, bearing as it does upon the phenomena of growth and development, the action of disease, the formation of varieties, races, etc. The book is an admirable piece of scientific criticism—clear, fair, and impartial.

Señor Juan Vucetich, chief of the statistical and anthropological identification office of the police of the province of Buenos Aires, has kindly forwarded to the *Anthropologist* a copy of his work (pages i–xvii, 1–203, with 2 charts), the title of which may be rendered in English as "General Instruction for a System of Registration for the Province of Buenos Aires." This is the second edition, revised and enlarged, the first having appeared in 1895.

The author in this elaborate and painstaking work, which though based upon the system of Bertillon is by no means a copy of it, gives in much detail the plan which he has suggested and which has been adopted in Buenos Aires for the identification of criminals.

Instead of the eleven measurements of Bertillon he takes but one, that of the body length, and seems to rely very largely upon the facial characteristics, the contour of the face, the color of the eyes, shape and direction of the eyebrows, nose, mouth, chin, and ears. The distinctive marks and scars are carefully noted and referred in location to the subdivisions of the body, of which over a hundred are given. Thumb-marks are also taken and preserved as a means of identification. Directions for taking photographs are also given.

Señor Vucetich's system has not, of course, been in use long enough to afford a practical test of its efficiency, but there can be no doubt, if his directions are carried out with a care approaching to that with which they are framed, his plan must prove successful.

This work and the introduction of such a system are evidences of the enlightened progress of the Argentine Republic.

C. H. A.

The Education of the Central Nervous System: A Study of Foundations, especially of Sensory and Motor Training. By Reuben Post Halleck, M. A. (Yale). New York: The Macmillan Co. Price, $1.00.

This is a pleasantly written book, made up mainly of excerpts and didactic discussion. The author appears not to have undertaken any experiments or observations himself, and his opinions are therefore necessarily theoretical. It seems to dignify work like this overmuch to collect it into a book and give it a title that induces the reader to suppose that it contains the results of original investigations. The proper place for such essays is in the columns of the magazines, where they serve to while away an idle hour and are not mistaken for serious scientific work.

NOTES AND NEWS

HISTORIC DOCUMENTS FROM THE FOURTEENTH CENTURY B. C.—Since 1892, when the original text and translations of the clay tablets of Tell-el-Amarna were first published by the press, the insight into their importance for ancient history has steadily increased, and recently some writer has even declared them the most valuable documents for Oriental historiography of the pre-Islamitic epoch. Shortly after the discovery of the tablets the largest number were purchased by the Museum of Berlin and published by it in 1892. There were 160 tablets, many of them in a fragmentary condition. The British Museum obtained 82 tablets, the majority in a perfect state of preservation. The trustees of that institution published them the same year. The Boulaq Museum at Gizeh, owned by the Egyptian government, has 60 of these precious relics, and a few only passed into the hands of private persons. Most of our readers are familiar with the fact that these tablets are written in Assyrian and contain the diplomatic correspondence between Egyptian subjects in Phœnicia, Palestine, and the East with two kings of Egypt of the fifteenth century B. C. Amenophis the Third (the last pharaoh of the XVIII dynasty) and Amenophis the Fourth, called the "heretic" because he introduced a sort of solar monotheism after a Babylonian model. Not only was this royal act a great shock to the utterly conservative Egyptian mind, but the transfer of the government seat from Thebes to a site near the present Tell-el-Amarna must have proved still more offensive. In the ruins of this ephemeral capital, about 150 miles south of Cairo, the clay tablets were found. Their text has just been reëdited in a thoroughly revised form by Professor Hugo Winckler, translated into German and English, and published by Reuther and Reichard, Berlin, of whose "Keilinschriftliche Bibliothek" it forms volume 5. Considering the manifold difficulties which still encumber the full understanding of these messages, the editor confesses that his edition can only be regarded as a transitory essay for something better to come. A new comparative study of all the originals was needed to clear up doubtful passages and to obtain the correct readings. Many texts are worded in an orthography partially faulty or fanciful, or were impressed into the soft clay with more imperfect tools than the regulation "chisel," while others have suffered by breaks at the edges. There are many words and phrases not fully understood yet, in spite of the help afforded to their study by the other monuments we have in the Assyrian dialect of this Semitic language, which shows the most ancient forms of all the dialects of the Semitic stock. Winckler has transcribed the texts by Roman letters. He separated all the syllables expressed by *one* cuneiform group-sign by hyphens, and every word commencing a new line is marked by a separate number in the Assyrian text, as well as in the translations. Long vowels are distinguished as such by the macron. The authors of these messages placed their names, titles, and signatures *at the head* of the missive, like the Greeks and Romans, and not at the end of them, as Europeans have done since the beginning of the middle ages. The usual modes of allocution to kings and princes were set formulas of an official character, and appear to us rather servile, as the "dust of thy feet," "seven and seven times I fall down before you." The central power in Egypt must have been at that time weak and irresolute, for many of the tablets report seditions, open revolts, and intrigues against the king and his vassals in the provinces, robberies and devastations perpetrated by the revolting chiefs. Other tablets enumerate at length the tributes destined or sent to Khuen-aten, "Glory of the sun-disk," the royal name assumed by Amenophis IV; and when princesses and women of noble birth were married from Egypt to foreign potentates their trousseaus and escorts are described at length. Many towns of Phœnicia are mentioned, but in a form rather puzzling to Bible readers. Thus Beirut is called Biruna, Birutu, Tyrus; Sur-ri, Sidon; Zimrida, Canaan; Kina-ahna and Kinahi, Gaza; Hazati, Azzati, Jaffa (Joppa) Yapu; and Memphis, Hikubta.

The locality east of the Nile where, in 1887, an Egyptian peasant woman found the first of these tablets, has since then been ransacked repeatedly, though nothing of any consequence was found; but the gains already derived from this find (Winckler has 296 numbers) are so great for science that we may be thankful for this opportunity to set us thinking and studying about so many new facts and problems. To help further research the editor has added a glossary of words on 34 pages and a list of proper names of persons and places on 8 pages. The other volumes of the "Keilinschriftliche Bibliothek," under the editorship of Professor Eberhard Schrader, contains historic, administrative, commercial, and poetic texts in large numbers, which will be of appreciable assistance to the students of the Tell-el-Amarna tablets, for they are worded in Assyrian also. The recent discoveries of inscriptions at Nippur, near the Persian gulf, has brought to light monuments believed to date five to seven thousand years before[1] our era, a fact which cannot fail to stimulate the study of cuneiform literature in an unprecedented degree.

A. S. GATSCHET.

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[1] Cf. last annual report of the Archeological Institute, Boston, Mass.

THE TARASCO LANGUAGE of Michoacan, western Mexico, has been recorded and published in vocabularies, grammars, and religious texts at various times since 1551. In the year named a Franciscan missionary, Juan B. B. de Lagunas, issued the first compendium of the language in the City of Mexico. He was followed, in 1559, by Fray M. Gilberti, and, as the Indians speaking Tarasco formed a very considerable population, many apostles of the Catholic faith were sent to reclaim these natives for Christianity. The Tarasco language is spoken in almost all parts of Michoacan and northward into the state of Guanajuato. The early territorial capital of the tribe was Tzintzuntan; the site of the present capital, Morelia, was then called Juagangaro. The local names throughout this territory end frequently in *-ro*, which forms a locative case; thus Querétaro signifies "at the place of the ball-play." The Nahua people under the leadership of the Aztecs attacked them, but never succeeded in subjugating them. An ancient and highly interesting Spanish account, which probably belongs to the period between 1570 and 1590, bears the title "*Ritos y ceremonias del antiguo reino de Michoacan;*" the anonymous author has added illustrations to the text in water-colors. It is preserved in the Library of Congress at Washington, and a revised copy of the work is in possession of Dr Nicolas León. That gentleman has for several years been the editor of the *Museo Michoacano*, an octavo periodical, and has published therein many interesting and valuable historical articles, which have been the means of directing the attention of the scientific world to the isolated Tarasco people.

Through the joint efforts of Dr León and the French linguist, Raoul de la Grasserie, study of the Tarasco language has recently been resumed, and the results of their researches are now presented to students of linguistics in a more scientific form than has previously been the case. The work appears under the title, *Langue tarasque; grammaire, dictionnaire—textes traduits et analysés par Raoul de la Grasserie et Nicolas León. Paris: J. Maisonneuve, 1896.* (8°, pp. 293.) The volume forms number 19 of the *Bibliothèque linguistique américaine.*

The definitions of the words and the rendering of the religious texts are in French, and are arranged in double columns. By this work the study of the Tarasco language is greatly facilitated.

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MORPHOLOGY OF TUSAYAN ALTARS

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The word morphology has been appropriated by naturalists, and, as generally defined, is limited to comparative studies of the modifications in structure of animals and plants. In the pages which follow I shall use this term, perhaps inadvisedly, with a different application, preserving its strict etymological meaning, as a science of forms.

In one sense the anthropologist, as well as the biologist, has morphological problems to solve, and it is my purpose to indicate the nature of one of these as applied to an obscure branch of our science. The title of my article might perhaps more happily have been worded "A Comparison of a Few Tusayan Altars Chosen from Different Ceremonies" to illustrate a similarity in type or plan. The present examination is an attempt to discover from the symbolism of Tusayan altars the dominating elements of the ritual, or to trace the common strands which connect rites, myths, and religious paraphernalia. I shall attempt to show that although many altars appear to vary very greatly in form, in reality their resemblances are very close, and that two conceptions dominate all others in their symbolism. These two elements are thought to result from climatic conditions, great aridity, and uncertainty of crops, acting on the mind of an agricultural people, whose greatest desires, which among all people determine the character of their rituals, are that their corn may sprout and grow to maturity, and that rain will water their farms. The ceremonials of the Hopi are made up of rites to influence supernatural beings who control these processes, and it remains to be shown that the character of the altars reflect the same through their symbolism.

While my present analysis is not comprehensive, and fails to include all Tusayan altars, it considers at least two groups, one of which is known as the *Katcinas*,[1] the other chosen from a number of ceremonials of societies unrelated to this division.

That phase of ancestor worship called the *Katcina* cult controls fully one-half the Tusayan ritual, beginning with January or February and lasting until July, inclusive. It is distinguished from other components by the presence of masked participants, called *Katcinas*, which are deified spirits of ancestors. The yearly departure of these worthies from the villages is celebrated in July by a great ceremonial called the *Nimán Katcina;* their arrival, by several rites, one of the most striking of which is called *Powámû* or " Bean Planting." At the times of their arrival and departure there is erected in each of the five villages which celebrate them an altar about which certain secret rites are performed. Our knowledge thus far is limited to three[2] of the five *Nimán Katcina* altars, and there still remain two, those of Oraibi and Cuñopavi, regarding which nothing has yet been recorded.[3]

I have been interested to discover what proportion of the whole number of ceremonials in Tusayan have been described, and the results are such as to allay any conceit that we know much about the subject. Without considering abbreviated ceremonials, there are twelve in the Tusayan ritual which are of nine days' duration. There are five variants of this ritual, differing in altars, paraphernalia, and rites, so that we may say there are performed in Tusayan about sixty ceremonials, each nine days long, to be investigated. Of these, there are forty of which we know nothing save their existence; fifteen, fragments of which have been described, and five which have been fairly well studied. There are about thirty altars which have never been figured or, so far as I know, seen by ethnologists. It thus appears that there is plenty of material in this province to occupy students of primitive ritual for some time to come.

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[1] The *Katcinas* have nothing to do with the following, among other, ceremonials in Tusayan:

Snake Dance.
Flute Ceremony.
Lalakoñti.
Mamzrauti.
Owakülti.
Wüwütcimti.
Naácnaiya.
[Soyáluña.]?

Their great ceremonials are *Powamû*, *Palülükoñti*, and *Nimán Katcina*, and they have many abbreviated dances every summer, as I have described in vol. II of Journ. Amer. Eth. and Arch. The Sitcomovi *Calako* must be ranked among the great *Katcina* exhibitions on the East Mesa. It is possible that *Soyaluña* may also be found to belong to this group, but from the little I now know of this obscure ceremony I judge that it commemorates the return of the sun, as elsewhere indicated.

[2] Journ. Amer. Eth. and Arch., vol. II, No. 1.

[3] Sitcomovi and Hano have no *Nimán Katcina*, nor do they celebrate the Tusayan ritual in its entirety.

It can hardly be expected, however, that descriptions of the modifications of the altars of the same societies in different villages will materially change the types which we are able to construct from those which are known. Modifications will doubtless be found, but no radical differences. Variations are to be expected, but experience has taught that fundamentally all Antelope altars are the same, and all *Katcina* altars are made in a typical form, while all Flute altars are practically identical. Although we know nothing of the *Lálakoñti* and *Mámzrauti* altars of any village but Walpi, I venture to predict that when those, now unknown, are described their differences from those at Walpi will not be one of type, but of minor variation. If, in other words, we know one altar of a given society well we will have no difficulty in recognizing the same type in the other four Tusayan villages.

There are, therefore, believed to be at least as many types of *tiponi* altars as there are sacerdotal societies, and the most difficult question is a comparison of these types rather than members of the same type.

The Katcina Altar at Cipaulovi

Cipaulovi is the smallest of all the Tusayan pueblos and its altars are the poorest in ceremonial paraphernalia.[1] Nowhere is this poverty better seen than in the *Katcina* altar of that village. It consists of a figure of seven rain-clouds, with parallel lines, representing falling rain, drawn on the floor of the kiva with sacred meal, in front of a row of five vertical sticks, symbolic of cornstalks or growing corn. Upon that part of this meal picture which represents falling rain four stone implements are arranged in a row. There are no anthropomorphic images on this altar, and unless the stone implements may be so interpreted, no symbol of lightning. The *Katcina* altar at Cipaulovi is very simple,[1] but we may rightly suspect that the essentials of a *Katcina* altar are present. The two prominent symbols are those representing rain-clouds and growing corn, and as they are elaborated in the more complicated altars, we may justly regard them as embodying two main aims of *Katcina* rites.[2]

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[1] For description of the Nimán Katcina altars of Cipaulovi, Walpi, and Micoñinovi, see Journ. Amer. Eth. and Arch., vol. II, No. 1.

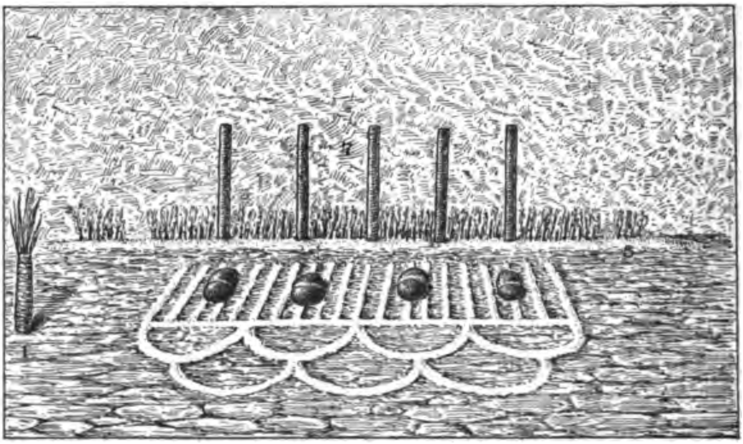

FIG. 1—*Katcina Altar at Cipaulovi.*

The Katcina Altar at Walpi

The Walpi altar is next in simplicity to that of Cipaulovi. It has, however, an upright reredos, instead of a meal figure on the floor, upon which are depicted rain-cloud symbols. Two supplementary upright slats, with pictures called *Tuñwup*, an anthropomorphic representation of the sun, are present. There are zigzag slats, symbols of lightning, and round sticks with emblematic corn designs.

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[1] In all the altars which we are considering there is always a *tiponi* or chieftains' badge. Accessories like medicine bowls, trays of sacred meal, aspergills, etc, are common to all altars, and are not regarded as distinctively characteristic enough to be of value in comparative studies. Homologous objects on these altars have the same numbers in the cuts.

[2] The character of public *Katcina* dances, even when abbreviated, justifies the belief that they are performed for rain and corn The pranks of the clown priests are concerned with growth of crops, over which this society has special powers.

While, therefore, the altar at Walpi is more complicated than that at Cipaulovi, it is not as rich in accessories as that of Micoñinovi.

The Katcina Altar at Micoñinovi

The *Katcina* altar in this the most populous village at the Middle mesa is still more complicated than the Walpi representation. In addition to other objects found on the Walpi altar it has two images, one on each side, and while the zigzag sticks fail, stone implements, similar to those on the far simpler Cipaulovi altar, are present. There are two symbols of maize, as at Walpi, and numerous sticks, representing growing corn, recall the same symbols of the Cipaulovi equivalent.

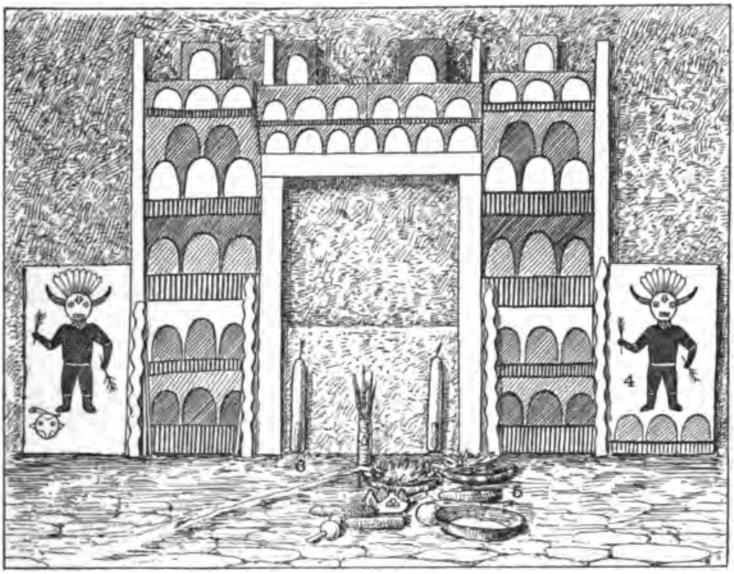

Fig. 2—*Katcina Altar at Walpi.*

The two images of the Micoñinovi altar are evidently those of the Little War God and the Germ Maid. There can be little doubt of the accuracy of identification of the latter, and the former has the parallel marks on the body symbolic of Püükoñhoya.

A comparative study of the symbolism, simple and elaborate, of the *Katcina* altars leads me to the conclusion that the altar at

Micoñinovi is the most complicated yet described,[1] and that this complication is an elaboration of the less developed and not due to the introduction of new elements. Analysis reduces this composite symbolism to rain-clouds, fertilization, growth, and maturity of corn, the most important elements of the whole Hopi ritual.

A somewhat more detailed statement of this point is perhaps desirable. In Tusayan dramatic celebrations of mythic events three methods of representing supernatural personages are adopted: 1st, personifications by men, women, or children; 2d, representations by images or idols; 3d, representations by pictures, conventionalized objects or symbols. These three methods may coexist, they are interchangeable, and are phylogenetically connected in the development of rituals. In public

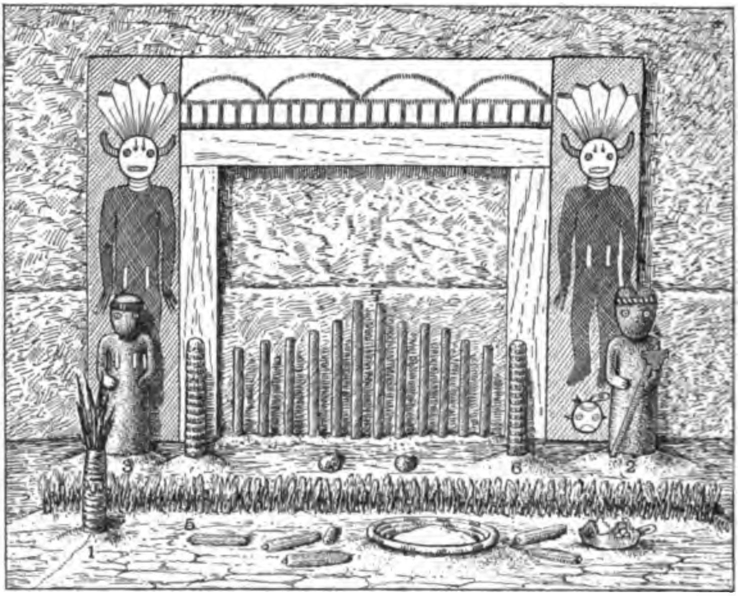

Fig. 3—*Katcina Altar at Micoñinovi.*

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[1] Mr H. R. Voth has kindly sent me photographs and sketches of the Oraibi *Katcina* altar, which show that it is even more complicated than the Micoñinovi. He has also given me a copy of his notes on the Oraibi Powamû, with permission to quote them, but as he has in mind a detailed description of this elaborate ceremony, it is best not to anticipate his account with fragmentary references. They add strong support to the conclusions arrived at in this article.

ceremonials the first method is almost invariably adopted. but in secret rites all three are employed.

The representations on the *Niman* altar at Cipaulovi and Walpi are limited to the third method, those at Micoñinovi include likewise the second.

There is no need of considering more in detail the character of the symbols illustrating the third method of representation on *Katcina* altars. They refer, as already stated, to rain, lightning, and corn in various stages of growth. A clearer idea of the use of the second method, representation by images, is perhaps desirable. These figurines, commonly called idols, occur on the *Katcina* altar of Micoñinovi, and are really symbols of a male god, who wields the lightning, and a female divinity, who controls rain and corn. They are simply more highly specialized symbols of the same conceptions as the pictures used in the third method.

The image with the rain-cloud coronet is a representation of a mythic rain corn personage, who has many names, appearing in ceremonials, both public and secret, of several different sacerdotal societies.

In the ceremony called the *Lálakoñti* she is personated both by women in the public dance and by effigies on the altar, and is called the *Lakone mana*, or maid.

In the October ceremony, called the Mamzrauti, she[1] is likewise represented by the first and second methods, and is called the *Mámzrau mana*,[2] or Mamzrau maid.

During the dramatization in[3] the Antelope kiva of the Snake ceremonials at Walpi she is personated by a maid called the *Tcüa mana* or Snake maid, but no effigy of her is employed in this archaic ceremony. The Flute society represent her in their rites in both the first and second ways—with two girls in the public dance and images on the altars in the secret rites—when she is called the *Leñya mana*[2] or Flute maid.

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[1] In the public dance she is represented by a girl, but there is a beautiful instance in this ceremony where the third method is substituted for the first in the public dance. For some reason unknown to me in the 1891 exhibit at Walpi no girl took this part, but her place was taken by a participant in the dance who was not dressed as the Germ Maid (*Mamzrau mana*), but bore in her hands a flat board with a picture of the Germ Maid (see *Mamzrauti*, pl. IV, figs. 9, 10). The picture, not the bearer, represented the Germ Maid. It is a remarkable confirmation of my theory that *Mamzrau mana* is the same conception as *Calako mana*; that this picture is identical in symbolism with pictures of the latter, and was so called by the priests. Comparing the picture of *Mamzrau mana* on the *Mamzrau* altar and that of the same on this tablet, we have examples of old and new Hopi art. The picture, publicly exhibited, conforms to modern conception of her symbolism; that on the altar is drawn in simpler and more primitive style of art.

[2] Amer. Anthrop., July, 1892.

[3] Journ. Amer. Eth. and Arch., vol. IV.

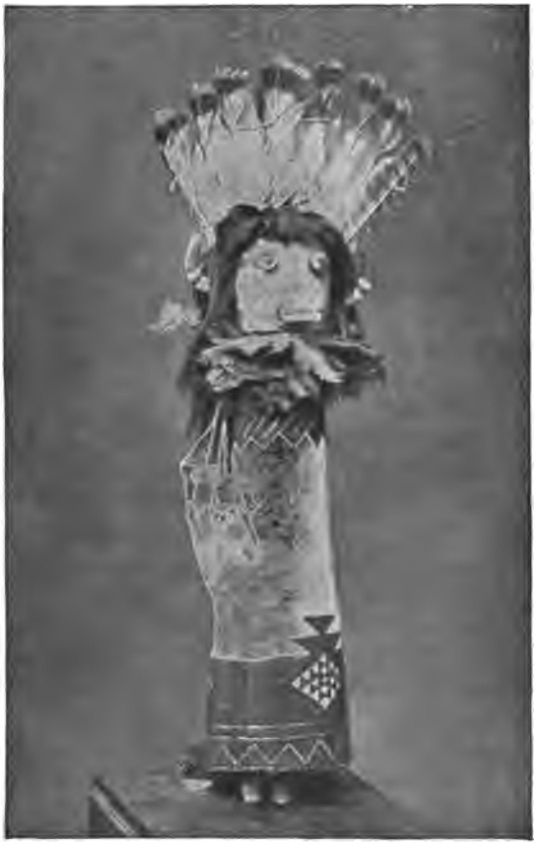

FIG. 4—*Doll of Calako-taka.*[1]

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[1] The doll shown in this figure is in the Hemenway collection of the Peabody Museum at Cambridge. The plates were originally published in *Columbia's Emblem*, and were kindly loaned by the Riverside Press. Somewhat larger plates of the same doll were published in *El Centenario*, Madrid, 1893 The Calako-taka doll here figured is several feet high, and is made of a log, the lower half of which is hollow, containing the carved imitation of the body and legs of a man. The blanket is an exact imitation of a wedding blanket. Calako-taka is represented in Sitcomovi in July. See the Fifteenth Annual Report Bureau of Ethnology, shortly to be published. For similarity of doll of Calako-taka and paintings of *Tuñwup* on Katcina altars compare the above doll with figs. 2 and 3, lateral designs on reredos.

[2] Journ. Amer. Eth. and Arch., vol. II; Journ. Amer. Folk-Lore, vol. VII, No. xxvii.

In a ceremony called *Palülükoñti* she is personated by the first and third methods, and is called the *Calako mana*.[1] The most elaborate figurines[2] of this being, known as the Corn maids, are used as dolls, and are well represented in various ethnological museums.

All her different names, and some others which might be mentioned, are aliases, sacerdotal society names of the same mythological conception, which may be called *Muiyinwû*, the Germ goddess, associated with rain.

This image is called the rain-germ (corn) maid because in the most elaborate representations of her this bifid nature is strongly indicated by symbolism. Her idol on the Micoñinovi Flute altar has four symbols or pictures of maize on the body and three rain cloud tablets on the head. In numerous dolls she has a picture of an ear of corn on her forehead and an elaborate rain-cloud emblem, with rainbow above it, as shown in figure 5.[3]

The symbolism of the lefthand image of the Micoñinovi *Katcina* altar, although highly conventionalized, is clearly enough defined to show that it represents the Rain-germ goddess or the Corn maid.[4]

The other image, likewise known in various Tusayan ceremonials by tutelary sacerdotal aliases, is the male *Katcina* cultus hero, the fructifying principle symbolized by lightning and personified by such supernaturals as *Püükoñhoya*, *Tcüatiyo* (Snake youth), *Leñyatiyo* (Flute youth), and the like.

The images of the altars, therefore, as well as the pictured symbols, show us that fructification, growth, and maturity of corn and representation of rain-cloud, lightning, and rain are the most important conceptions involved.

I have not yet offered a suggestion in regard to the pictures of *Tuñwup*, which are quite prominent on both the Walpi and Micoñinovi *Katcina* altars. I believe they are representatives of

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[1] Journ. Amer. Folk-lore, vol. vi, No. xxviii.

[2] Archiv. Internationales, 1895.

[3] In one of the dolls figured in my article on "Dolls of the Tusayan Indians" (Archiv. Internationales, 1895, pl. ix, fig. 31) we have the two Corn maids and *Hehea Katcina*, a being with zigzag lines on the cheeks and phallic symbols on the breast, represented like a totem-pole, one above the other.

[4] As maize is the important food plant of the Tusayan and Pueblo Indians, there is a tendency to call this rain-germ maiden the Corn maid, as appears in the nomenclature of dolls, where no special religious society name is involved.

Tawa, the sun, in anthropomorphic form, for the following reasons, and that this beneficent being is introduced as father not only of all life, but as giver of the great blessings desired by the celebrants of the ritual.

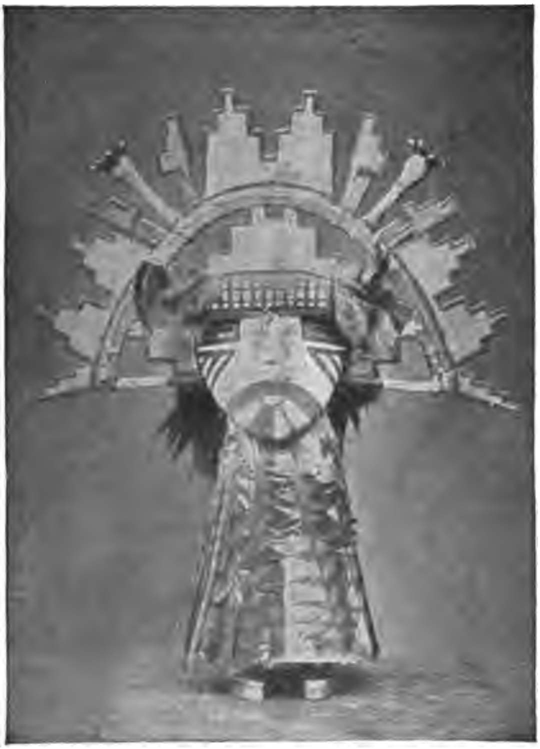

Fig. 5—*Doll of Calako mana.*[1]

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[1] The terraced bodies on the head are rain-cloud symbols; the semicircle, which is colored with different pigments, the rainbow. The two pyriform bodies are tipped with radiating rods connected with yarn, and are symbols of squash blossoms and the whorls in which Hopi maids dress their hair. The rectangular design on the forehead is a symbol of an ear of maize, and from it, above the nose, there hangs a small fragment of haliotis shell. The feathers on the body represent the feathered garment which the Corn maids are reputed to have worn. For similarity of symbolism of this goddess with the Flute maid, compare rain-clouds on head, squash symbols, and markings on the cheeks with effigy, pl. i, fig. 2, *Jour. Amer. Folk-lore*, vol. ix, No. xxxv; also ibid., vol. vii, No xxvii, pl. i, figs. 1, 2. For similarity with Mamzrau maid, compare *Amer. Anthrop.*, July, 1892, pl. i, fig. 4, and pl. iv, fig. 10, where the likeness is very striking. For similarity with Lakone maid, compare *Amer. Anthrop.*, April, 1892, pl. i, fig. 3, right-hand section of sand painting.

If we examine the head and appendages of the picture of *Tuñwup*, we find the symbolism corresponds closely with that of *Calako taka*, a doll of which is figured in one of my plates. Both have two horns, crests of feathers, and similar markings on the foreheads.

When the Corn maids brought all colored corn seeds to the Hopi, it is said in their legends that the young men were initiated by being flogged by *Calako taka*, and this flogging initiatory ceremony still occurs every year at *Powamû*, either by a personator of this mythic person or at the altar when he is symbolically present, as I have described in the 15th Annual Report of the Bureau of Ethnology.

Calako taka is represented by four giants in a ceremony which occurs in Sitcomovi in July of each year, as I have described in the article just mentioned, at which time these "bird monsters," accompanied by *Eototo* and a number of *Koyimse* or mud-head priests, enter the pueblo and perform many rites connected with direct sun worship.[1]

The avian symbolism of *Calako taka* is an expression of the many instances in Hopi worship of an association of the sun and the eagle or some raptorial bird, and these four monsters represent fabulous giant sunbirds. The special ceremonials in which they participate occur at the summer solstice in Sitcomovi and near the winter solstice in Zuñi.

Tuñwup and *Calako taka* are practically the same conceptions with different names, and a figure of this god or the sun naturally is drawn on *Katcina* altars.[2]

Let us now in our comparative studies pass to a consideration of the altars of those ceremonials which occur between the departure of the *Katcinas* and their return, or the ceremonies of August to December, inclusive, and show the morphological resemblances between their altars and those of the *Katcinas*. Of these I will choose the Flute, since we know the variations of the Flute altars in the same three villages, Walpi, Cipaulovi, and

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[1] This celebration at Sitcomovi is derived from the Zuñi Shalako, celebrated at the winter solstice in that pueblo.

[2] The two ceremonials *Powamû* and *Palülükonti*, in both of which sun emblems play a conspicuous role, are rites for the germination of corn and beans. This process in the primative mind is akin to sorcery or brought about by the arts of wizards; consequently the former occurs in the *Powako* or wizard's moon, *Powako muiyawû*, which gives us by syncopation *Powamû*. It is also, as I have pointed out, a purification or lustral ceremony when children are initiated or introduced to the *Katcinas*.

Micoñinovi, the *Katcina* altars of which pueblos have been compared.

An analysis of these altars shows us that the same dominant elements, rain-making and growth of corn, exist here as in *Katcina* altars; the same two cultus heroes, male and female, the lightning, the germ maids, and symbols of rain-clouds. Other elements which are peculiar to the society are introduced, but in essentials the altars are homologous. The Oraibi Flute altar lends additional evidence to my conclusions, but although I have elsewhere described it, I have not brought it into my present comparisons, in order to limit myself to the three villages where *Katcina* altars are considered.

To simplify my comparisons I will limit myself to one set of Flute altars in the three villages or those erected by the Blue Flute society, which is vigorous in the villages of Cipaulovi, Walpi, and Micoñinovi.

Each of the three Blue Flute altars which we are studying has a reredos upon which, as in *Katcina* altars, rain-cloud symbols are depicted, and in addition we have in the Walpi variant a figure of the sun introduced.

Flute Altar of Cipaulovi[1]

The Flute altar of Cipaulovi is the simplest in symbolism. The reredos is represented by upright slats, arranged side by side, obscurely marked with rain-cloud symbols. In front of the vertical slats are sticks, emblematic of growing corn or cornstalks. The four zigzag symbols of lightning hang from the rafters of the room in which the altar is erected.

The two figurines—one male, the other female—stand one on each side of the altar. One of these is the Corn maid, the other the Flute hero, both known by the society names the Flute maid and the Flute youth.

The other objects—birds, flower mounds, and pollen trail—do not concern us in our comparisons, save to lead me to say that they are common to all Flute altars, and are absent in *Katcinas*.

Flute Altar at Walpi

Passing now to the Flute altar of this village, we find it, as that of the *Katcina* of the same place, more complicated than that of

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[1] Journ. Amer. Folk-lore, vol. VIII, No. XXXI, pl. II.

Cipaulovi, and less so than that at Micoñinovi. In it likewise we find the main symbols on the uprights are rain-clouds and corn designs. Four zigzag slats hang from the transverse part over the objects below.

Here likewise are the sticks representing growing corn. Three figurines stand before the altar on the floor; the two at the left representing the Corn maids, one of whom, *Muiyinwû*, has figures of corn on her body and three rain-cloud tablets on her head.

The figure on the right is a symbol of the hero, the Flute youth, but although these idols are called by society names, their symbolism leaves no doubt of their identity with images on other altars.

Flute Altar at Micoñinovi[1]

It needs but a glance at the two Flute altars at this village to see how close they both are to similar forms already studied.

The pictures of rain-clouds on the reredos are the same; there are zigzag slats, symbols of lightning, and rods representing corn, in seed or stalk.

We have likewise the Corn maids and the Flute youth, as in the other altars.

Comparing, therefore, the main elements indicated by symbols on the Flute altars of Cipaulovi, Walpi, and Micoñinovi, and we find they represent the same dominant ideas as the essentials of the three *Katcina* altars of the same villages; so there is a certain type relationship between them.

The cultus hero and the two Corn maids, which, as we have seen, figure so conspicuously in both Flute and *Katcina* altars, are represented in the public exercises of the Flute by a lad and two girls, or by what I have designated the first method of personification. It is hardly necessary for me to describe them in detail, or to introduce facts to show that the girls represent the Corn maids, and the lad the Flute hero. I have a suggestion to make explanatory of their non-appearance in the public exhibitions. It would be unwise to bring out of the kiva the effigies of these worthies to be seen by vulgar eyes of the uninitiated, and consequently the three children don appropriate costumes to represent the same mythic beings.

They are toled into the village from the spring called Tawapa by symbols of rain-clouds drawn on the ground, as I have already elsewhere described.

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[1] Journ. Amer. Folk-lore, vol. VIII, No. XXXI.

Antelope Altar in the Snake Dance

It could hardly be recognized at a glance that the altars of the Antelopes have any great resemblance to those of *Katcinas*, or Flute societies, and, indeed, outwardly they appear widely different. Morphologically, however, I regard them very similar. The symbolic representations on the sand altar of the Antelopes at Walpi are rain-clouds, falling rain, and lightnings, comparable to those on the reredos of *Katcina* altars of Walpi and Micoñinovi or the Flute altars of the villages where they are known. It may be asked, however: Where are the representatives of the two supernaturals, male and female, the cultus hero, and the Corn maid? In reply I would say that these are represented not by wooden images, as in the Flute, but by a boy and girl, who stand one on each side of the altar on the last days of the sixteen songs' ceremony. They wear the same clothing as the Flute hero and maid and represent what these worthies personify. The boy is the Snake Cultus hero; the girl, the Corn maid. Hence the former carries his emblem, the snake, symbol of the Snake society, while the latter appropriately bears the earthen bowl with cornstalks and bean vines, emblem of her function.[1]

The same dominant elements control the Antelope-Snake ceremony as the *Katcinas* and Flute, and the same mythological beings figure in it.

We might, if space permitted, extend our comparisons to the altars of the great germinative ceremonies, the *Lalakoñti* and *Mamzrauti*, where we would find the same male and female figurines, representatives of cultus heroes and germ maids. We might likewise point them out in the public exercises of the same ceremonies. There are variations characteristic of the societies, and the idols bear different names, but behind these unimportant variations are the same conceptions, variously worked out, which I have designated rain-clouds and rain, lightning, germination, growth, and ripening of the corn crop.

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[1] In my memoir on the Walpi Snake Dance I have not emphasized sufficiently the elements of corn worship which pervades it. The ceremony is performed both for rain and abundant harvests, and differs from others only in the fact that the Snake priests introduce their "elder brothers," the reptiles, to aid them in bringing the rains. The Antelope dance on the eighth day is practically for abundant crops, and the Snake dance, when the reptiles are carried by the Snake priests, is a prayer for rain.

We must await new studies to become familiar with modifications of altars in different villages, but enough is already known to predict that they will show us simply modifications of these elementary ideas, the substratum of all Hopi worship.

On the screen of the Walpi *Palülükoñti* we find the same symbols, rain-clouds, lightning, sun emblems, and pictures of the two Corn maids and two males or lightning gods, comparable with either *Cotokinuñwû* or *Püükoñhoya.* In this ceremony, likewise, we have the effigies of the Plumed Snakes and the symbolic dramatization, through their agency of the earth by the sun, of the fertilization of the cornfields in the way I have elsewhere described. Even in this highly modified form we detect the same elements which were found in the altars previously considered.[1]

We are justified in regarding the supernaturals personated by adults or children and represented by symbols in the form of images or pictures on Tusayan altars as spirits of the ancients. On this theory we have a ready explanation of the fact that *Katcinas* are represented by masked persons, and as a corollary a suggestion regarding the symbolism of the masks they wear.

The Hopi, like many people, look back to a mythic time when they believe their ancestors lived in a " paradise," a state or place where food (corn) was plenty and rains abundant—a world of perpetual summer and flowers. Their legends recount how, when corn failed or rains ceased, culture heroes have sought this imaginary or ideal ancestral home to learn the " medicine " which blessed this happy land. Each sacerdotal society tells the story of its own hero, who generally brought from that land a bride who transmitted to her son the knowledge of the altars, songs, and prayers which forced the crops to grow and the rains to fall in her native country. To become thoroughly conversant with the rites he marries the maid, since otherwise at his death they would be lost, as knowledge of the " medicine " is transmitted not through his clan, but to the child of his wife. So the Snake hero brought the Snake maid (corn-rain girl) from the underworld, the Flute hero, her sister, the Little war god the *Lakone mana*. A *Katcina* hero, in the old times, "on a rabbit hunt, came to a region where there was no snow. There he saw other *Katcina* people dancing amidst beautiful gardens. He received melons from them and carrying them home told a strange story of a people who inhabited a country where there were flowering plants in midwinter. The hero and a comrade were sent back, and they stayed with these people, returning home loaded with fruit during February. They had learned the songs of those with whom they had lived and taught them in the kiva of their own people."[1]

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[1] It is very much to be hoped that exhaustive studies may be made of *Soyaluña* and *Palülükoñti* in all the Tusayan villages, for our knowledge of them is at present very fragmentary and recorded facts too scanty for accurate generalizations.

In the ceremonies with unmasked personifications an attempt is made to reproduce the conditions which these cultus heroes saw in the lands they visited, to augment the efficacy of the ceremonies copied.

In the *Katcinas* the same feeling is dominant. Each performance is an endeavor to reproduce an ancestral *Katcina* celebration, and in this sense is a dramatic performance, reproducing, as far as legends can guide them, the nature and *personnel* of the ancestral ceremony. The performers are masked because, according to their stories, the participants in those ancient rites had zoömorphic and totemic, or at least only partially anthropomorphic, forms. The symbolism of the mask betrays the totem of those ancestral personages—corn, rain, water-loving animals, lightning, and the like.

I have shown that the most prominent symbols and figurines on several Tusayan altars of widely different societies refer to the sun, rain-clouds, and the fertilization, growth, and maturity of corn. Masked performers represent supernaturals connected with the production of the latter. The ceremonial acts about the altars or in the public exhibitions have one intent, to affect the gods who control these necessities. In their complicated rites the priests believe they can do this by reproducing ancestral ceremonies and are guided in their presentation by current legends. Personifications, masked or unmasked, are therefore introduced that the performance may be more realistic—a more accurate reproduction of the ancient. This feeling is essentially the reason why the priests are so conservative and why, unable to explain the reason they perform certain rites in certain ways, they respond when pressed for explanations, " We make our altars, sing our songs, and say our prayers in this way because our old people did so, and surely they knew how to make the rains fall and the corn grow ; " hence the reason also that they invariably, when asked to explain the meanings of their ceremonies, repeat the story of an ancestral or cultus hero who visited strange lands, where they learned rites powerful to bring rain and make corn grow, and returning with their knowledge taught them to their kindred. and as time passed were divinized and worshipped.

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[1] Journ. Amer. Eth. and Arch., vol. II, No. 1, p. 152. The *Katcina* hero in this story would appear not to have brought a wife from this people.

It looks to me as if the same evidences of composition which we find in the social organization of the Hopi can also be detected in their ritual. Originally a few clans living in separate villages, time and possibly desire for mutual protection has led them to unite into phratries and larger groups, whose members are only distantly related by blood. Each new increment brought its contribution to the ritual, and did not abandon its own rites on consolidation; hence the marvelously rich ritual which has resulted. Some of these components are so close to others that we may suppose the phratries who brought them were closely related; others vary so widely that they can hardly be compared. Probably no one component of the consolidated stock ever practiced all the ceremonies now observed yearly in any one of the five largest Tusayan towns, but the growth of the system has kept pace with the advent of additions. In the same way no doubt they would receive any new cult, and they probably accepted Christianity, when it first came to them, as an addition to those preëxisting. When, however, it dawned upon them that the padres intended to unify their religion, and substitute for ancient ceremonials a new system, it was far above their comprehension. They pronounced the innovation *Powako*, or sorcery, and so effectually eradicated it that for over two centuries no missionary could live among them.

THE DIRECTION IN WHICH MAYAN INSCRIPTIONS SHOULD BE READ

LEWIS W. GUNCKEL

It is extremely interesting to trace back the struggles of a race or nation of people in their first efforts and endeavors to raise themselves from a state of abject barbarism up to a scale of semi-civilization, entirely separated and uninfluenced by any surrounding culture or enlightenment.

Such was the unique position of the ancient Maya race, whose strange monuments, temples, and bas-reliefs are found so frequently throughout Chiapas, Yucatan, Tabasco, Guatemala, and western Honduras. Undoubtedly the most interesting of these ancient monuments are the strange mural inscriptions, tablets, and records of this unique aboriginal American civilization, the correct interpretation of which is yet to be demonstrated, we trust, by some future Champollion.

Many attempts have been made to read these inscriptions, both in this country and abroad, but the results so far obtained are entirely unsatisfactory. One essential point must first be decided on before entering into a detailed study of the inscriptions of Central America, and that is how the characters are to be read, from the left to the right or the reverse, up or down in columns, or in double columns. This has always been a puzzling question, for we find the katuns or cartouches arranged in rectangular blocks or tablets, in horizontal and vertical lines, and in right angles facing in opposite directions. One would naturally assume that to decide on this important question before we have succeeded in interpreting the characters and general significance of the graven inscriptions would be a useless task. Such, however, is not the case, as a close inspection of the inscriptions will demonstrate.

The most vexatious point in this investigation is the mere fact that the same rule will not always apply in reading the various groups, tablets, and columns of these so-called calculiform glyphs. Dr Brinton emphatically states that whatever the prevailing rule concerning the direction of reading the glyphs might have been, the native artists seemed to have no hesitation in disregarding it when artistic or other reasons presented themselves.[1] Other conservative students have since reached the same conclusion. We find on consulting the works of the various students of the subject that there is a great divergence of opinion as to the proper method and direction of reading these graven texts. Our first duty, therefore, is to sum up the opinions and evidence produced by each authority, to classify them under the various headings, then to recapitulate the evidence and results thereby obtained and deduct our matured conclusions from the ground covered. For convenience we have classified the various methods proposed as Plan I, II, III, IV, and V, by which names we shall refer to them in the following pages:

Plan I—A. P. Maudslay was of the opinion that the inscriptions or tablets should be read in double columns, from left to right and from top to bottom; also that the large figure at the upper lefthand corner of many of the inscriptions was, as he calls it, "the initial scroll of the series." He believed that inscriptions containing this peculiar heading, and this regular series of portraits underneath, generally began with the same formula, which extended usually through these six or seven squares. His reason for this was that in the sixth square, or sometimes in the latter half of the sixth square, is found a human face, usually in profile, enclosed in a frame or cartouch.[2] Dr Cyrus Thomas thought that the large character at the upper lefthand corner of the Palenque tablet was used much in the same way as we use capital letters, and that the inscriptions are read either in columns from the top downward, or in lines, from the left to the right.[3] He found that in the Manuscript Troano the characters are, as a general rule, placed in columns, to be read from the top downward; but that, where circumstances require it, they are placed in lines, to be read from left to right. He thinks that we would be justified in assuming that the same rule applies to the tablets. But later in his work, after a close examination of the Palenque tablet of the "Cross," and noting the first seven characters of the two columns immediately below the large initial, he seems to have changed his mind and suggests[1] that the remaining characters of these two columns be read by twos to the bottom, and to continue the same way throughout the tablet, taking each double column from top to bottom. This latter suggestion for the reading of double columns will correspond with Mr Maudslay's scheme, and we will therefore place it under this heading (Plan I). His first suggestion we will classify under Plan III. Dr Thomas also says that the lines and columns in the middle portion of the tablet should read from the left to the right along the lines until a column is reached, and then down the column.

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[1] A Primer of Mayan Hieroglyphics, University of Penna., series of Phil. Lit. and Arch., vol. III, No 2, p. 79.

[2] Explorations of the Ruins and Site of Copan, Central America, in Proc. Roy. Geog. Soc, Sept., 1886, p. 593.

[3] A Study of the Manuscript Troano, Washington, 1882, p. 137.

Plan II—Dr Brinton believes that the proper reading of the tablets (such as the Tablet of the "Cross") is to begin at the top of the two righthand columns, read them together downward, then the next two to the left in a similar manner; but the last two on the left, those headed by the great *Pax*, should be read from below upward. He thinks that this plan alone corresponds with the natural sequences of the groups of glyphs, and that the huge sign at the upper lefthand corner, instead of being the "initial" glyph, is in reality the terminal.[2] We learn from Dr Förstemann[3] that in manuscripts in long computations the numeral elements are to be read from below upward, and from right to left. This plan differs from Dr Brinton's scheme, but would agree in his reading of the two columns headed by the large glyph, which he reads from below upward, making the large character the terminal.

Plan III—Dr Thomas' first suggestion[4] was that when the characters were arranged in lines, of reading from left to right, and when in columns from top to bottom. This was also the opinion of M. Pousse,[5] while Léon de Rosny also expressed his opinion that the characters should be read from left to right.[6] Professor E. S. Holden arrived at the same conclusion by his mathematical method of examination,[7] and he further says that in the case of columns they were to be read from the top to the bottom. In the case of tablets, they were to be read just as the present page is written. Wilson believed that the tablets were to be read in columns from the top to the bottom and in manuscripts from left to right.[1] Mr M. H. Saville[2] was of the opinion that the large glyph at the upper lefthand corner was the *Pax* glyph, and that it was the initial character of the series. He also points out a number of inscriptions which are headed by *Pax* in a modified form. He does not, however, express an opinion as to the method of reading the remainder of the inscriptions.

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[1] Ibid., p. 200.

[2] A Primer of Mayan Hieroglyphics, p. 136; also Ancient Phonetic Alphabet of Yucatan, p. 6.

[3] Zur Entzifferung der Mayahandschriften, No. II, Dresden, January, 1891.

[4] A Study of the Manuscript Troano, op. cit., p. 137.

[5] Archives de la Soc. Amer. de France, 1887, pp 27, 28, 113, et seq.

[6] Essai sur le Déchiffrement de l'Écriture Hiératique de l'Amérique Centrale, folio, Paris, 1876.

[7] Studies in Central American Picture-writing, First Annual Report of the Bureau Ethnology, p. 223.

Plan IV—Dr P. J. J. Valentini was of the opinion that the inscriptions were to be read from the left to the right in the columnar direction,[3] and in the case of the double columns these are to be read in double columns down to the point where the column of portraits stop. Beyond this point the columns should be read separately, for they stand in this way throughout the tablet,[4] according to his opinion.

Plan V—Brasseur de Bourbourg devoted much attention to the direction of reading the glyphs in the manuscripts, and was greatly influenced by the direction in which the figures appeared to be moving and the way the faces were turned, which in most instances is toward the left. He therefore concluded[5] that the characters should be read by lines, from right to left, and by columns, from the bottom upward; in which method of reading he was followed by Bollaert.[6] This plan agrees perfectly with the method of reading the long computations of numerical elements in the Dresden Codex (pages 61–64, 69–73) pointed out by Dr Förstemann. The numerals found in connection with the figures of snakes on these pages of the Dresden Codex are to be read from the right to the left, and from below upward.[7]

It is of utmost importance that we find out which one of these five diversified methods is the correct one. Until this point is settled, it is impossible to know the correct serial arrangement of the cartouches in the inscriptions. This can be done only by close examination and study, not only of the Palenque tablets, but also of others, from various localities, in order that some definite conclusion may be obtained by having at our disposal all possible data. It is immaterial in this investigation as to whether these calculiform glyphs occurring in the graven texts are phonetic, ideographic, or intermixed. One fact is certain, and that is, that whatever form was used, we shall have groups or assemblages of glyphs recurring in the inscription when the same incident, name, or idea is written, and that these recurrences must be governed by certain fixed laws which can be learned only by a close study and analysis of characters and their occurrences and sequences in the inscriptions. Then, again, there must be names of deities, kings, priests, etc, which would recur from time to time in the graven texts, and these can easily be noted by comparison and by the frequency of their occurrence. There are a number of noteworthy points about these records on the manuscripts and tablets which should at once attract the attention of the student. Some of these have previously been pointed out by Dr Brinton, and to these we will add some others which have come under our observation:

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[1] Pre-historic Man, p. 378, et seq.

[2] A Comparative Study of the Graven Glyphs of Copan and Quirigua, Jour Am. Folklore, July-September, 1894, p. 238.

[3] Professor Valentini adds that this is also the arrangement as stated by Landa, p. 44.

[4] Analysis of the Pictorial Text Inscribed on Two Palenque Tablets, Proc. Amer. Antiq. Soc., Worcester, Mass., 1896, part II, p. 6.

[5] Introduction to the Codex Troano, by the Abbé Brasseur de Bourbourg, published by the French government in 1869.

[6] Exam. of Cent. Am. Hier., 306.

[7] Zur Entzifferung der Mayahandschriften, No. II, Dresden, January, 1891.

1. The faces of deities, priests, etc, in the mural inscriptions and manuscripts are almost always drawn facing the left.

2. The apparent movement of the principal figures, both in the inscriptions and the manuscripts, is generally from the right to the left.

3. The more important parts of the composite characters are placed on the right side, and the affixes added on the left side.

4. In writing the numerals, the bars representing fives are placed to the right, and the dots meaning units are placed to the left.

These four points would make one infer that the lines were written from the right to the left, but we do not believe that we are justified in assuming such a conclusion from such insufficient data. We will mention below a few points which seem to have an important bearing on the direction for reading the inscriptions.

5. In not less than thirteen of the principal inscriptions we find at the upper lefthand corner a glyph of larger dimensions than those following which, with various modifications and ornamentations, bears a great resemblance to *Pax*.

6. Directly under this enlarged glyph, at the upper lefthand corner, follow a series of portraits which, with their ornamentation and affixes, take the space of two columns.

7. A close examination of the Palenque tablet will show that in many cases the characters are found in pairs or groups, which recur frequently throughout the inscription.

8. These pairs and groups of characters are always arranged in such a way that the reading of the inscription by double columns is not interfered with. Should one character of a pair be on the righthand side on one line, the other one will be found on the left side on the line immediately below, following the usual sequence.

9. These pairs are found also in the single vertical columns one above the other, showing that the single vertical column reading is from top to bottom, or for a transverse single line from left to right.

10. The divergence in the direction of reading on some of the inscriptions and manuscripts was not, we believe, caused by the carelessness or capriciousness of the ancient sculptor, but in accordance with fixed laws, a few of which have been discovered.

11. It will be found that all these inscriptions, when in the shape of a tablet, are of such number of vertical columns that it can be divided by two without a remainder. In other words, it can be read by double columns without having an extra column left at the end. They are generally of two, four, six, or more columns, but always of some even number.

12. In some of the inscriptions (for example, the bas-relief of Bernouilli) we find a wider spacing between each set of double vertical columns, as if to give greater prominence to each double set, so that they can be followed and read with greater ease.

Let us now turn our attention to the well known Palenque tablet of the " Cross." One can notice at a glance at this inscription that there is a large glyph at the upper lefthand corner which takes up the space of four ordinary squares. We find this in no other corner. Then directly below this we find seven compound glyphs taking up the space of two regular squares. Six of these contain the profile of a head conjoined with other glyphs. The rest of the group are of uniform size, except that those surrounding the cross are of a smaller type than those on the tablets on each side. One cannot fail to admire the extreme regularity and uniformity of these tablets and wonder at the skill shown by the ancient sculptor. When my attention was first attracted to the study by the researches of Professor Holden it seemed enigmatical to me how he deduced his conclusions about the direction of reading the glyphs from his mathematical examination of the Palenque tablets. Being trained in mathematical and astronomical research, his conclusions on such a subject seemed to me at that time, on this point, unassailable; nevertheless unsatisfactory. Now, it seems that we have found the reason for this. If the reader will turn to pages 221–223 of his work[1], it will be found that his studies in regard to the direction of reading the glyphs were mostly concentrated on the righthand side of the Palenque tablet of the "Cross," and but little attention was paid to the peculiar initial heading on the lefthand side tablet or the row of double-column glyphs directly beneath the heading. Students familiar with the tablets will readily understand the point which we mean, for this peculiar arrangement at the upper lefthand corner contains the key to the whole enigma.

We do not doubt that had Professor Holden devoted the same study to the lefthand tablet as he did to the righthand side, the results and his conclusions deduced therefrom would have been vastly different. The student habituated to our use of large initial capital letters at the upper lefthand corner in our modern magazines and books naturally assumes that these inscriptions are to be read from left to right, for we generally find in the upper lefthand corner a hieroglyph larger than any of the others, as in the case of the Palenque tablet. It is a noticeable fact that we never see these large forms in any other corner (as at the right side or at either of the lower corners). From the valuable researches of Mr Saville[2] and from other sources we learn that many of the Mayan inscriptions have the enlarged glyph resembling *Pax* at the upper lefthand corner. Let us carefully go through the various inscriptions and find out how many times this occurs and see what results can be deduced. The following inscriptions and tablets are all headed by the large glyph resembling *Pax*, differing only in the ornamentation and affixes:

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[1] Studies in Central American Picture-writing, op. cit.

[2] A Comparative Study of the Graven Glyphs of Copan and Quirigua, op. cit.

1. Inscription on Stela A, Copan, Honduras.
2. Inscription on Altar S, Copan, Honduras.
3. Inscription on Stela I, Copan, Honduras.
4. Inscription on Stela F, Quirigua, Guatemala.
5. Inscription on Tablet of the "Cross," Palenque, Chiapas.
6. Inscription on Stela C, Copan, Honduras (south side).
7. Inscription on Stela C, Copan, Honduras (north side).
8. Inscription on the back wall of Altar No. 3, Palenque, Chiapas.
9. Inscription on the south side of monolith at Quirigua, Guatemala, Maudslay's plate III.[1]
10. Inscription on the south side of monolith at Quirigua, Guatemala, Maudslay's plate XIV.
11. Inscription at Copan, Honduras, Maudslay's plate XVI.
12. Heading of an inscription on the side of a monolith at Quirigua, Guatemala, Maudslay's plate XVII.
13. Heading of an inscription on a vase from Quiché tomb, Guatemala.[2]

Thus we have, at the very least, thirteen important inscriptions bearing this peculiar heading at the upper lefthand corner. We can see no valid reason why these large characters should be the terminals of the inscriptions, as Dr Brinton suggests. As a matter of fact, all the evidence seems to point the opposite way, and we have no hesitation in accepting these large headings as the initial glyphs of the series.

Let us now make a close examination of the various inscriptions and see if we cannot find some occurrences and sequences of the various characters which will help us in deciding the correct direction for reading the graven texts. In our investigation we will take advantage of the peculiar sequences in the Palenque tablet, so ably pointed out by Professor Holden[3] and augmented and continued by Dr Cyrus Thomas.[4] The latter has clearly shown by these sequences that Plan I is the correct method of reading the Palenque tablet; consequently some repetition is necessary in again demonstrating that point. We will present the sequence of the pairs and groups of characters in such a way that the reader may see at a glance the great importance they have in connection with the general direction of reading the inscription. Our attention for the present will be confined to the one inscription, commonly known as the Palenque tablet of the "Cross."

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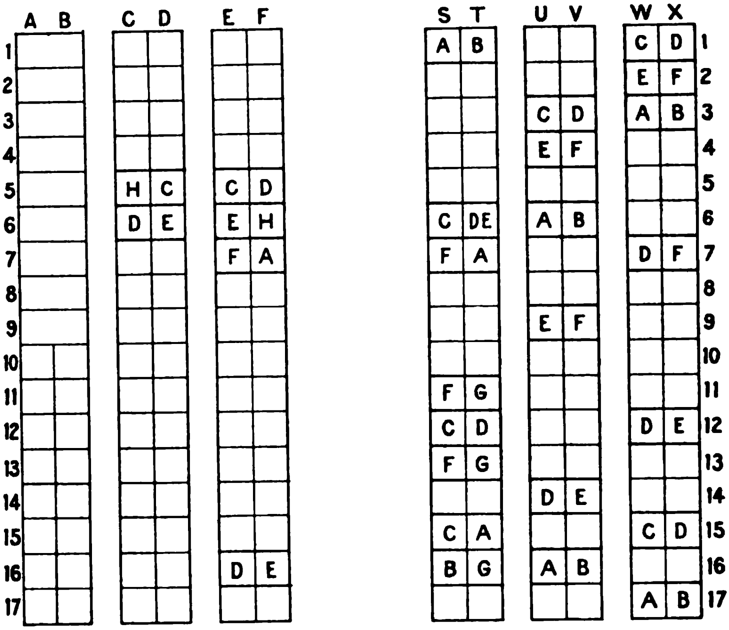
[1] The plates of Mr Maudslay are presented in his article in the Proceedings of the Roy. Geog. Soc., London, Sept., 1886.

[2] Figured by Dr Brinton in his Primer of Mayan Hieroglyphs, p. 140.

[3] Op cit., 223.

[4] Op. cit, 200.

We present in figure 1 the index diagram used by Dr Rau for locating the various characters, which we have changed by separating it into double columns, as in A B, C D, E F, etc, so as to show to greater advantage the pairs and sequences that occur in the tablet. According to this plan, we have three double columns on each side of the central figures. If Plan I be correct, we will find these characters occurring in pairs, which must fall in the correct columns. Let us try this and take, for instance, the two characters at the upper lefthand corner of the righthand tablet, S 1, T 1. Let us call S 1 "*A*," and T 1 "*B*," and at each place where this pair occurs we will place the letters A and B. By referring to figure 1 it can readily be seen that this pair occurs in S 1, T 1; W 3, X 3; W 17, X 17; U 6, V 6, and U 16, V 16—a total of five times. These pairs are found always on the same line, and always in the columns to which they belong, according to our theory of reading by double columns in Plan I,



	A	B	C	D	E	F	S	T	U	V	W	X	
1							A	B			C	D	1
2											E	F	2
3									C	D	A	B	3
4									E	F			4
5			H	C	C	D							5
6			D	E	E	H	C	DE	A	B			6
7					F	A	F	A			D	F	7
8													8
9									E	F			9
10													10
11							F	G					11
12							C	D			D	E	12
13							F	G					13
14									D	E			14
15							C	A			C	D	15
16					D	E	B	G	A	B			16
17											A	B	17

FIG. 1.

and no exception is found. Now, if one of the pair should occur on one line at the right, and the other on the line below, at the left, it would only tend to strengthen our evidence. This, however, does occur four times. By referring to figure 2 we find at the righthand side of the double column in T 7 our character "*A*," and, on the next line below, at the left side in the square S 8, our character "*B*," just as it should be, making the pair of characters A B follow each other correctly in T 7, S 8; but this

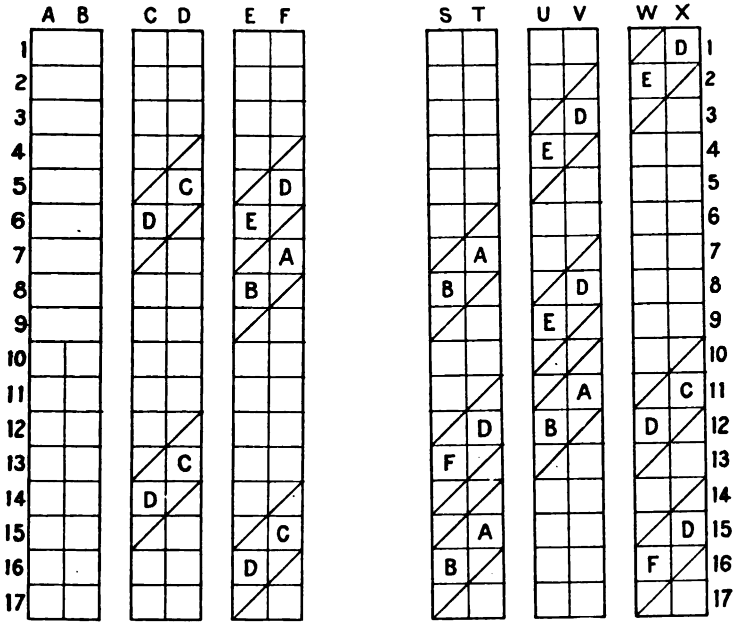


Fig. 2.

may be a mere coincidence. Perhaps we may find others. On closely examining our figure 2, we find it occurs again in the same way in V 11, U 12; T 15, S 16, and F 7, E 8. This makes a total of nine pairs for the characters A B. We think that the mere sequence of the two characters A B would be sufficient to prove this, but to make sure of it we will try another pair of glyphs, and take W 1, X 1. We will call W 1 "*C*," and X 1 "*D*." By referring to figure 1, we learn that this pair is found in W 1, X 1; W 15, X 15; U 3, V 3; S 12, T 12; E 5, D 5—a total on the same horizontal line of five times in the tablet, or six if we count

S 6, T 6 (the latter part of which is a combination of the characters which, for convenience, we call *D* and *E*). Now, let us see if this pair is also found on different transversal lines and in correct order, according to the double-column theory. We find it that way in X 11, W 12; F 15, E 16; D 5, E 6, and D 13, E 14—a total of four times, as shown on our figure 2. This makes a total of ten pairs for the characters C D. It is a noticeable fact also that the same pair is found in R 2, R 3, proving that these single vertical columns are to be read from top to bottom.

Another pair of glyphs commonly associated with each other is found in U 4, V 4 (figure 1). Let us call the character U 4 "*E*," and V 4 "*F*," and note the occurrences of this pair in the tablet. On referring to our figure 1, we find it occurs in U 4, V 4; W 2, X 2; U 9, F 9—a total of three times on the same line. We also find it in the correct order, but on different transversal lines, in X 12, W 13; T 6, S 7, and V 14, U 15, as shown in figure 2, making in all a total of six pairs, three on the same horizontal line and three on different transversal lines.

The pair W 12, X 12 also is found frequently in the tablet. We have already named the character W 12 as "*D*" and the character X 12 as "*E*." By referring to figure 1, we find this pair occurs in W 12, X 12; U 14, V 14; in T 6; E 16, F 16, and C 6, D 6. It also is found on different transversal lines in X 1, W 2; V 3, U 4, and F 5, E 6, as shown in figure 2, making a total of eight times.

It is a noticeable fact that these pairs do not occur at any time in the wrong columns, otherwise it would, if occurring often, or even once (although this might occur by mere coincidence), destroy our evidence. It is surprising also that the characters follow each other so correctly when on different transversal lines, one above at the right, and the other below at the left-hand side of the double column.

The evidence seems to accumulate, the deeper we go into the matter. Let us now take a group of three characters and find out if the sequence is correctly carried out. Take the characters W 1, X 1, W 2, which are placed in this position

C D
E

with each other. By referring to our figure 3 we find these three characters at the upper righthand corner, which we have previously called C D E. Now, if this same combination can be found occurring in rotation a number of times in the tablet, our evidence is complete. By referring to figure 3 we find it occurs not fewer than seven times in correct rotation as follows: W 1, X 1, W 2; U 3, V 3, U 4; S 6, T 6; V 13, U 14, V 14; E 5, F 5, E 6; D 5, C 6, D 6; D 13, C 14, D 14, and F 15, E 16, F 16. In the group V 13, U 14, V 14, and at three other places on the same tablet, as shown in figure 3, we find the order reversed in this manner—

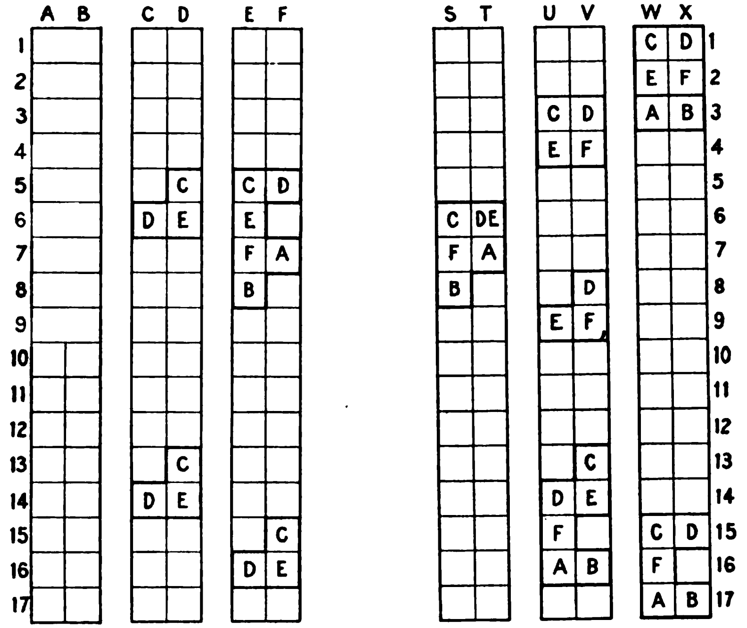


Fig. 3.

C

D E

which is absolutely correct according to the sequence of the characters.

We will now select a group of four characters to test the sequence. Let us take W 1, X 1, and W 2, X 2, which, by referring to figure 3, we find at the upper righthand corner, marked C D E F, according to our former plan. We find these four characters following each other in the correct sequence, in W 1, X 1, W 2, X 2; U 3, V 3, U 4, V 4; S 6, T 6, S 7, and V 13, U 14, V 14, U 15. The last combination takes a peculiar shape as follows:

	C
D	E
F	

but a close examination will prove that the sequence of the characters is correct and in accordance with the double-column theory. Finally, let us take a large group of six characters, as C D E F A B, the six characters at the upper righthand corner of the tablet, as shown in figure 3, in the squares W 1, X 1; W 2, X 2; W 3, X 3. We find this same group in S 6, T 6, S 7, T 7, S 8, making the compound glyph T 6 stand for both D and E, which are combined in one character (figure 3). The first group is found in this shape—

C	D
E	F
A	B

and the second as follows:

C	DE
F	A
B	

We find nearly this same combination in three other places in this tablet, one in this form:

C	D
E	
F	A
B	

This contains another character between the characters E and F. Then, again, we find another, as follows,

	C
D	E
F	
A	B

in which a new character is placed between the characters F and A. We also find one more group as follows,

C D
F
A B

where we find five of our characters with one new form introduced between F and A, as in the last-mentioned group.

Let us now examine another Palenquean inscription, the tablet on the back wall of the altar, Casa No. 3, forming the frontispiece of Stephen's "Incidents of Travel in Central America," vol. II. We find in this inscription that there are four columns on each side of the central figure, which agrees perfectly with the plan of reading by double columns. Here we find again the large initial glyph and the series of double portrait characters beneath, taking up the space of two squares each. The pairs and sequences do not occur so frequently in this tablet as in the other, but we find enough to verify our former results. We find in the squares N 1, O 1, our pair D E in the correct order and columns, and we find it again in C 15, D 15. In the square A 10 we find a character which we will call "*M*," and in B 10 another, which we will call "*F*," making the pair M F in the correct double columns. Now, at the bottom of the B column we again find the character M, and on looking up at the beginning of the next set of double columns we find its mate, the character F, in C 1, thus making a key or connection between the two sets of double columns. We find this same form of connecting link on the righthand side of the same tablet. At the bottom of the second column we find our character C, and at the top of the columns three and four (N 1, O 1) our characters D and E, making the three characters C, D, and E follow each other exactly as they should, according to the theory of reading by double columns. We have not the slightest doubt but that a close examination of all the other tablets and inscriptions will bring exactly the same results. Lack of space, however, will prevent us from continuing these comparisons.

In looking over Rosny's *Les Documents Écrits de L'Antiquité Américaine*[1] we find a most remarkable corroboration of this theory of reading the inscriptions by double columns. If the reader will refer to this work and examine plate 10–11 of the Bas-relief of Bernouilli it may at once be seen. This valuable inscription was called to the attention of Professor Rosny while at Dresden by Dr Meyer, who saïd that it had been deposited at the Musée Ethnographique at Bâle. Rosny visited the museum and photographed and described the inscription, which he named *Bas-relief Yucatèque de Bernouilli.* It is composed of three fragments of sculptured panels of Campêche wood, measuring 1 meter 80 centimeters in height, and was discovered at Tikal, northeast of Lake Peten, Guatemala. The principal panel gives a representation of a priest or other important personage clothed in garments covered with a profusion of rich ornaments and holding in one hand a long spear or lance. On each side of the central figure are interesting inscriptions; that on the left contains four columns of seven cartouches each, making 28 squares; the one on the right contains four columns of nine cartouches each, or a total of 36 squares. To those familiar with the other inscriptions there is nothing remarkable in all this, but if we examine the inscriptions closely we find that each set of double columns is separated from the other one by a wide interval. This is not fortuitous, for we find it is the same on both the right and left sides, with fully as wide a space as we have shown in figures 1, 2, and 3 of the Palenque tablets, in which case it was done merely to demonstrate more clearly the sequences and groups of characters. This conspicuous and plainly marked separation of the double columns in the bas-relief of Bernouilli, we think, is an unassailable proof of the correctness of our theory and should leave no further doubt on the subject.

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[1] *Les Documents Écrits de L'Antiquité Américaine*, by Léon De Rosny; *Mémoires de la Société d'Ethnographie, No. 3*, Paris, 1882. In the appendix to this valuable work Professor Rosny gives a description of this interesting inscription (page 95), supplemented by four chromolithographs from photographs made by the author.

To recapitulate, we must emphatically state that we find no evidence worthy of consideration to support Plans II, III, IV, and V as to the direction of reading the mural inscriptions of the Mayas. The sequences and progression of the pairs and groups of characters in the inscriptions all point to one method of reading—that of interpreting by double columns where it can be done, as in tablets or assemblages of characters, when in horizontal lines from the left to the right, and in vertical lines from the top to the bottom. Where the horizontal and vertical lines form a right angle, as at the lefthand side of the central figures of the Palenque tablet of the "Cross," it should be read from the lefthand side to the right, then down the vertical line to the bottom. One objection might be brought forward by asking how we would read the right angle of glyphs on the righthand side of the central figures in the tablet of the "Cross." This, we think, was formed in this way merely to conform with the one on the opposite side, so as not to mar the regular and artistic appearance of the whole inscription. It should be read from the left to the right along the horizontal line and then down the vertical column. Such divergences to the general rule are sometimes necessary when a picturesque and artistic effect for the whole group was desired by the ancient sculptor. We can find some points which corroborate our conclusions from the sequence and rubrication in the ancient Mayan manuscripts. Many pages of these codices are divided into small divisions or compartments by red lines which separate the various sentences or paragraphs, consisting usually of four or six characters.

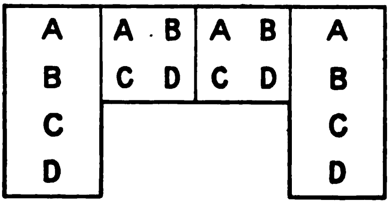

FIG. 4.

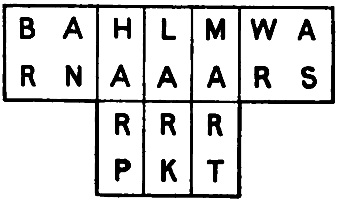

FIG. 5.

In figures 4, 5, and 6 we show the general arrangement of these small divisions and compartments which make up each page in the manuscripts, and beneath, at the center or at each side, are usually placed two pictures. We have lettered the characters to show the order and sequence. Let us first examine figure 4. This arrangement was pointed out by M. Pousse[1] as being the usual order in many plates in the manuscripts. The reader will notice that it corresponds to a certain extent with the one used in the Palenque tablet, with the exception of the two outside columns which are to be read from top to bottom in single vertical columns.

It is to the method of reading the two groups of four characters each that we wish to call attention. In this method we read the first two characters from left to right, and then the two immediately below. Then we take the next two to the right above and the next two below, reading in double columns from left to right and from top to bottom, as in the Palenque tablet. We find this order reversed in figures 5 and 6, in which Dr Thomas[1] has pointed out the general arrangement for the characters in certain plates in the Manuscript Troano. But by referring to figures 4, 5, and 6 it can readily be seen that parts of each page are to be read from top to bottom in single columns when so arranged, just as we do in the inscriptions, and also that other portions of each page are to be read in double columns from left to right and from top to bottom.

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[1] Archives de la Société Américaine de France, 1887, pp. 27 et seq.

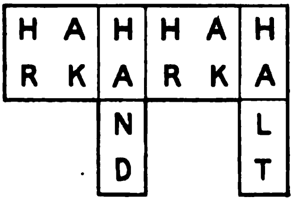

Fig. 6.

In closing, we may add that in our opinion sufficient evidence has been presented to satisfy any one beyond a reasonable doubt as to the correct method of reading the inscriptions.

Music of the Hopi Flute Ceremony.—In the summer of 1896 the writer had the good fortune to observe, with Dr J. Walter Fewkes, the Flute ceremony at the Hopi pueblo of Walpi, Arizona. In the course of the ritual, which is an invocation for rain, a series of songs are repeated each day for several days.

To one hearing Indian music for the first time the sensation was quite novel. The chorus of priests, rattle in hand, sang in unison before the Flute altar, in a narrow, low room without windows, greatly augmenting the volume of sound.

The time was set by the speaker-chief, who uniformly shook his rattle eight beats in five seconds for all the songs and for each day's songs with the accuracy of a metronome. There were three beats in each measure. The pitch was low, the range limited, and the deep vibrant voices seemed to portray the winds, thunder, rain, the rushing of water, and the elemental forces of nature.

The notation is chromatic, not possible to be expressed on any instrument save the violin or the specially constructed flutes which later accompanied the singing. These flutes marred the effect of the voices. They were played in unison on the octave above the voices.

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[1] Op. cit., pp. 138, 140.

In general effect the music is minor, but frequently major motives of great beauty spring out of dead-level monotonous minors. Sometimes a major motive is followed by a minor counterpart of the same. There is much slurring and an occasional reduplication comes in with great effect. A number of songs are monotonous, with once in a while a strong staccato movement. The closing song was spirited and may truly be called beautiful. It consists of several legato verses, each closing with a turn, a rapid vibration of the rattle, and a solemn refrain. In structure and melody it resembles a Christian hymn. The music reminds one of the Gregorian chants, and to the listener some of the motives seemed quite equal to those upon which Handel built his great oratorios.

The Hopi are noted far and near over the pueblo region as song-makers. It is a matter of surprise to travelers to find a cheerful, happy, music-loving people amid the arid wastes of Tusayan.

Dr Fewkes remarks: "I have heard the music of both the Zuñis and the Hopis, and know of nothing more effective than the singing by the priests at this time [Flute ceremony]. There was something in it which was different from the ordinary *Kōkō* and *Kātci'na* music, and yet there could be no doubt of its aboriginal origin. It was a concert to which the most cultivated could not take exception. The voices of the singers were good, and if the flutes did not give the best accompaniment the vocal part more than made up for their deficiency. Some one who has done me the honor of reviewing my account of Zuñi music has said that this music is strangely enough not hideous yells or ear-splitting discord. I wish every one who has not heard the best aboriginal music could hear the songs of the Flute festival. I know very little about music and have no keen ear for classical productions, but I found in this Indian singing much which pleased me. It would be well to judge the musical capabilities of the Indians by these weird and characteristic songs, not by imaginary war-cries and discordant noises which form the basis upon which Indians have too often been criticised."[1]

WALTER HOUGH.

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[1] Journal of American Ethnology and Archæology, vol. II, p. 147.

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WORMIAN BONES IN ARTIFICIALLY DEFORMED KWAKIUTL CRANIA

GEORGE A. DORSEY

After a somewhat careful examination of the available medical literature, and especially of the standard textbooks of anatomy, such as Quain, Testut, and the chapter on the skull by Spee in the forthcoming anatomy of von Bardeleben, I fail to find any special mention or reference to any paper on the occurrence of wormian bones in the coronal suture, or in the sutures of crania which have been artificially deformed. It seems that the subject is well worthy of more extended investigation, and I believe that in the collection of Kwakiutl skulls under consideration we have proof, in the unusual frequency of wormian bones in the coronal suture, that artificial pressure on the head of the child has a tendency to lead to anomalous conditions in the suture which is most intimately effected. That artificial pressure exerts an influence on the degree of serration of sutures as well as a disturbance in the normal time of closure of such sutures can, it seems to me, be reasonably demonstrated by a study of Peruvian crania, where within close limits we find the two extreme types of artificial deformation.

The Kwakiutl skulls in the Field Columbian Museum number about 60. Of these 35 are of adults, with sutures open or partially so, and hence suitable for examination, and percentages to be made hereafter will be based on the latter number. These skulls have all been artificially deformed by bandages which encircled the head in the region of the coronal suture and passed backward and downward over asterion. All the skulls, moreover, show to a greater or less extent the effect of pressure on the frontal bone.

The series may be roughly divided into two groups: those which show the force of the bandage in the form of a broad, deep groove at or just behind the coronal suture, and those which do not show a groove. In the first group I have recorded 9 cases and in the second one case of one or more wormian bones in the coronal suture, thus making 10 in all. I copy from my notes the essential points in regard to these 10 skulls, beginning with the single skull in the second group first.

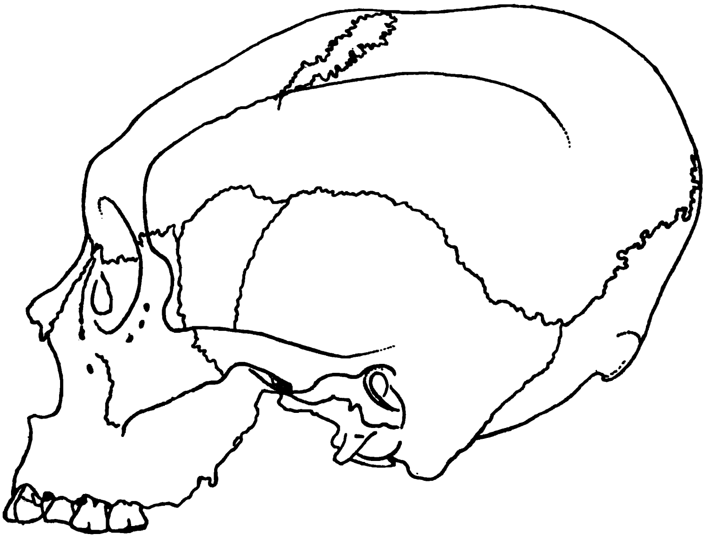

Fig. 1.

No. 40521.[1]—Skull of male; only moderately elongated; no trace of groove; coronal suture obliterated on each side below stephanion; epipteric bone at right and left pterion, and four wormian bones in left coronal suture just above stephanion.

No. 40696.—Skull of female; slightly elongated; coronal groove not present except at sides; coronal suture almost entirely effaced, but three small wormian bones in the left and two in the right coronal can just barely be seen.

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[1] Of the Field Museum Catalogue.

No. 40568.—Skull of female; slightly elongated; coronal groove faintly indicated; large wormian bone in left coronal suture.

No. 40523.—Skull of female; sutures almost entirely obliterated; slight coronal groove; two medium-sized wormian bones in left and one in right coronal suture.

No. 40500.—Skull of female; moderately elongated; well developed coronal depression; large epipteric at left pterion; three small wormian bones in both right and left coronal suture.

No. 40693.—Skull of male; excessively elongated; deep, broad groove just posterior to coronal suture; three wormian bones in both right and left coronal suture, one measuring 7 x 20 mm.

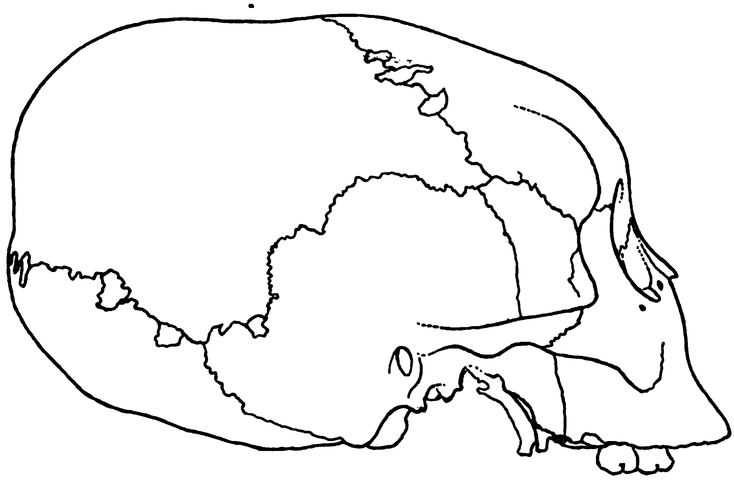

FIG. 2.

No. 40786.—Skull of female; greatly elongated; deep groove just behind coronal suture; sutures almost entirely obliterated; traces of one wormian bone in the right and three in the left coronal suture.

No. 40669.—Skull of male; excessively elongated; well defined, broad, deep groove just at and behind coronal suture; suture effaced below stephanion on both sides. In the left coronal suture there is an irregular, long, narrow wormian bone which measures 12 x 50 mm.; on the right side there are three wormian bones, one immediately after the other, and measuring together 40 x 10 mm. There is thus on each side almost a double coronal suture. (See figure 1.)

No. 40509.—Skull of young female; basilar synchondrosis partially open; much depressed about frontal region and very greatly elongated; broad groove behind coronal suture; three good-sized wormian bones in the right and two in the left coronal suture. (See figure 2.)

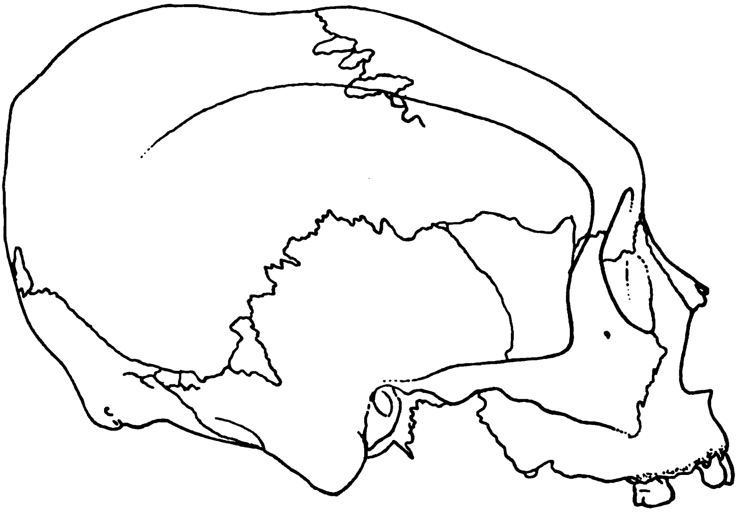

FIG. 3.

No. 40672.—Skull of male; frontal bone artificially flattened; excessively elongated—the most pronounced of the series; broad, deep groove just behind the coronal suture; five wormian bones in the right, three of which are of large size, and two in the left coronal suture, one of which measures 12 x 21 mm. (See figure 3.)

The frequency of occurrence for each sex and for the right and left side may be seen in the following table:

	Males.		*Females.*	
	Right.	Left.	Right.	Left.
Frequency of wormian bones in the coronal suture	3	4	5	6

It is thus seen that the percentage of frequency is slightly more in the females than in males, and on the left side than on the right. Both these conclusions are opposed to those reached by M. Chambellan,[1] who has made a special study of the frequency, etc., of wormian bones.

In regard to the percentage of frequency for the whole series and the causes which lead to its unusual size, one in three and five-tenths, I can only explain it by the presence of the evidences of bandaging in early life and by the fact that the percentage of frequency becomes the greater as we ascend the scale of length of the cranium due to artificial elongation, and just in direct proportion to a deep, well-defined groove behind the coronal suture. These causes, together with artificial pressure on the frontal bone, prevented a normal fronto-parietal development. To remedy this abnormal condition, wormian bones—"stop-gaps," as Humphry calls them—are developed in the coronal suture.

THE LAUGHLIN ISLANDERS have a number of interesting customs. They have a house set apart for the dead, and another house for the new-born. They keep up a great wailing for the dead, the corpse being kept in the dead-house for five or six days, the nearest relations watching the corpse. They smear themselves with what oozes from the dead body. Then the body is buried for a month, when it is taken up and the bones cleaned and packed in a bundle and buried in the forest. At childbirth the woman is moved into the house set apart for her, and she is made to drink large quantities of water. If the mother suffers great pain she kills the child, and the women around her show no sympathy for her or the child. The mother remains in this house eight days. Then a great fire is built around the house, which almost suffocates the mother and her offspring. The relations of the husband and the wife come and make presents, and a feast begins and lasts two days. The husband comes to this house; he and his wife are rubbed with cocoanut oil and decked with ornaments, and are thus presented to all gathered there if the child is the first born, as the eldest takes the father's place at his death.—*Australasian Anthropological Journal.*

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[1] "Étude anatomique et anthropologique sur les os Wormiens," Thèse, Paris, 1883. My knowledge of this paper is second hand and from several sources. I regret that I have not seen it.

THE LONG BONES OF KWAKIUTL AND SALISH INDIANS

GEORGE A. DORSEY

The measurements and indices in this paper have been taken after the manner described by Sir William Turner in the *Challenger* Report,[1] to which work reference is made for more detailed information in regard to the subject.

The material examined comprises the following: 19 skeletons of the Kwakiutl race of Vancouver island, B. C., including those of 9 males and 10 females, and 15 skeletons of the Salish race, 13 of them being of the Vancouver Songish and 2 of the Sanitch tribes. Of the entire number, 10 are of males and 10 are of females. There are thus in all 34 skeletons, there being 19 of males and 15 of females. It will be noted that I have made no comment on the length of any of the bones measured, but have confined attention to the indices which have been determined from the measurements. At another time I shall consider the lengths of the bones of these and other skeletons from the Northwest with a view of determining their stature.

BONES OF THE UPPER LIMB

I have made no observations on the ulna, and only the bones of the right side have been measured. In each bone I have determined, by means of an osteometric board, the maximum length; this for the humerus is from the most projecting part of the head to the most projecting point on the surface of the trochlea; for the radius it includes the styloid process. While measuring the humerus the occurrence of perforation of the olecranon fossa was noted. This occurred five times in 32 bones, or about 15 percent. Wyman puts it at 31 percent for the Ohio mounds, and it has been determined by Hamy[2] and Sauvages[3] to occur in about 5 per cent of European humeri. Perforation of the olecranon fossa may be due, as Flower contends, to impoverishment or insufficient nourishment, but certainly there is no evidence present in the other bones of these Northwest Coast peoples which supports this view. It may also be noted that in three of the perforated humeri their length exceeded the average. In no humerus was there any indication of a supra-condyloid foramen or spine.

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[1] *Challenger* Report, vol. xvi, "Report on the Bones of the Human Skeleton," pp. 89-114.

[2] Peabody Museum Report, 1871.

[3] Topinard, Éléments d'Anthropologie Générale, p. 1016.

Radio-humeral Index.—Table I presents a comparative view, both sexually and racially, of the measurements of the humerus and radius, together with the radio-humeral or antebrachial index, which is obtained from the formula:

$$\frac{\text{Maximum length of radius} \times 100}{\text{Maximum length of humerus.}}$$

Table I

	Kwakiutl.			*Salish.*		
	Humerus.	Radius.	Radio-humeral index.	Humerus.	Radius.	Radio-humeral index.
Males.....	342	274	74.2	308	241	78.2
	297	235	79.1	312	237	75.9
	295	222	74.9	324	240	74.0
	302	234	77.4	352	269	76.4
	307	237	73.9	302	235	77.8
	310	237	76.4	287	237	82.5
	324	240	74.9	313	231	73.8
	....	....	....	348	252	72.7
	306	244	79.7	304	219	72.0
	....	....	....	304	239	78.6
Mean...	310	239	77.0	315	240	76.1
Females...	304	218	71.7	287	205	71.4
	272	208	76.4	307	226	73.6
	263	205	78.7	291	211	72.5
	300	215	71.6	297	232	78.8
	290	214	73.7	....	....	....
	284	231	81.3	....	....	....
	292	213	73.1	....	....	....
	285	214	75.0	....	....	....
	291	218	74.9	....	....	....
	303	227	74.8	....	....	....
Mean...	288	216	75.0	295	219	75.1
Mean for both sexes.........			76.0	Mean for both sexes.		74.2

On examining the indices there appears to be no appreciable difference between the two races, but a slight difference between the two sexes. This, together with the distribution of the indices, may be seen in the following table:

Table II

Turner's classification.		*Kwakiutl.*			*Salish.*			*Kwakiutl + Salish.*			Total.
	Index.	♂	♀	♂+♀	♂	♀	♂+♀	♂	♀	♂+♀	
Brachykerkic...	71	...	2	2	...	1	1	...	3	3	19
	72	...	...	......	2	2	4	2	2	4	
	73	1	1	2	1	3	4	2	4	6	
	74	3	2	5	1	...	1	4	2	6	
Mesatikerkic....	75	...	1	1	1	...	1	1	1	2	12
	76	1	1	2	1	...	1	2	1	3	
	77	...	...	......	1	...	1	2	...	2	
	78	...	1	1	2	...	2	2	1	3	
	79	2	...	2	...	...	......	2	...	2	
Dolichokerkic..	80	...	...	......	...	...	......	...	...	......	2
	81	...	1	......	...	...	......	...	1	1	
	82	...	...	......	...	...	......	1	...	1	

It will be noticed that I have divided this table according to the classification proposed by Professor Turner. The average index, 75.5, falls into the mesatikerkic group, but as a matter of fact the majority of the indices fall within the limits of the brachykerkic group, *i. e.*, a majority show a relatively long foramen. In this respect these skeletons agree with Europeans, Lapps, Eskimos, and Samoyeds. It is greatly to be regretted there are no measurements available of other American races, but, except for a few single observations, the field seems never to have been touched.

Apart from the distribution of the indices, it is interesting to note the wide range of variation as shown in Table II. In the table given by Topinard[1] the highest average index is 79, while the lowest is 72. He gives, however, a single Eskimo with an index of 69.8. A few of the results incorporated in Turner's report also fall below 71, and a very few are higher than 82, but they are rare exceptions.

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[1] Éléments d'Anthropologie Générale, p. 1043.

I am inclined to believe that the people under consideration should be put into the brachykerkic division, notwithstanding the fact that the mean index just falls within the next group, for it is quite possible that one or two of the higher indices, especially the two which fall within the dolichokerkic group, are due to intermixture with the Indians of the east or south. There is some very good evidence which points to the conclusion that the greater part of the aborigines of North America are mesatikerkic, while we should expect those of the Northwest coast to agree rather closely with the Eskimo and northern Asiatic peoples.

BONES OF THE LOWER LIMB

I have made no measurements of the femur or tibia to determine the amount of flattening, but I noted the presence of a well-defined third trochanter in three instances and an imperfectly developed third trochanter in four others. The bones of the males are especially well marked with muscular ridges, and in many of the femora the pilastered form was strongly indicated. With the tibiæ there is a well-marked tendency to the platycnemic form, but this is never as pronounced as it is in some of the Ohio mound tibia.

Tibio-femoral Index.—The tibio-femoral index is determined by the formula $\frac{\text{length of tibia} \times 100}{\text{length of femur}}$. Both bones are measured by means of an osteometric board. The femur is measured in its natural or oblique position, and the tibia is measured from the condylar to the astragaloid surface—*i. e.*, the spine and malleolus are excluded. The measurements and indices are seen in Table III.

There appears to be no appreciable difference in the two races, but there is still a slight amount of variation in the two sexes, so that we may say that in the females the leg is shorter in proportion to the thigh than it is in the males, and in this, as in the radio-humeral index, the woman is further removed from the Australians, Negroes, *et al.* than are the men. To show the distribution I have arranged a table similar to Table II, but have not differentiated the sexes or races (Table IV).

Professor Turner has proposed to make 83 the dividing line between dolichoknemic, or long legs, and brachyknemic, or short legs. In the first division he places the Australians, Tasmanians, Negroes, and Americans; in the second group are the Europeans, Lapps, Eskimos, Samoyeds, *et al.* Reference to the table shows that out of 34 indices for the Northwest coast no single one falls within the dolichoknemic group, and in this respect, in

Table III

	Kwakiutl.			*Salish.*		
	Oblique-length femur.	Condylar-astragaloid tibia.	Tibio-femoral index.	Oblique-length femur.	Condylar-astragaloid tibia.	Tibio-femoral index.
Males....	481	386	80.2	392	317	80.8
	400	332	83.0	403	325	80.6
	395	311	78.7	424	341	80.4
	406	332	81.7	475	373	78.5
	414	324	78.2	410	324	79.0
	401	320	79.8	404	....	....
	410	337	82.1	417	317	73.6
	449	359	79.5	462	355	76.8
	424	338	79.9	399	320	80.2
	....	....	....	421	338	80.2
Mean..	441	337	80 0	420	334	79.2
Females.	403	328	81.2	395	311	78.7
	397	314	78.0	402	310	77.1
	390	307	78.7	429	331	77.1
	397	314	80.0	391	316	80.8
	403	322	79.9	383	311	81.2
	403	317	78.6	....	....	....
	400	301	75.2	....	....	....
	388	302	77.8	....	....	....
	407	....	....	....	....	....
	412	341	82.7	....	....	....
Mean..	400	314	78.5	400	315	78.7
Mean, both sexes			79.2	Mean, both sexes...		79.1

common with what we have seen in regard to the radio-humeral index, these people show close affinity to the Eskimo and north Asiatic people.

Table IV

Index.	Frequency of occurrence.
73	1
74	..
75	1
76	1
77	3
78	7
79	5
80	8
81	3
82	2
83	1
Mean..	79.1

Attention may also be called to the extremely low indices in Table IV. The lowest tibio-femoral index recorded by Topinard is 78, omitting the dwarf Bébé, while Turner presents only one index, that of a male Lapp, from his entire series, which reaches the lowest of my series.

UPPER AND LOWER EXTREMITIES COMPARED

Intermembral Index.—The intermembral index is the relation of the length of the humerus and the radius to the length of the femur and tibia, the latter being 100. The formula is

$$\frac{\text{humerus} + \text{radius} \times 100}{\text{femur} + \text{tibia}}.$$

For the determination of this index, however, the maximum length of both femur and tibia (excluding spine) are taken, in order that the sum of their lengths may be comparable with that of the humerus and radius. In the following table the sum of the humerus and radius is given, as determined from the measurements in Table I, along with the maximum lengths of the femur and tibia, together with their sum, and the intermembral index.

Table V

	Kwakiutl.				
	Femur.	Tibia.	F. + T. total.	H. + R. total.	Inter-membral index.
	mm.				
Males	486	397	883	616	69.7
	403	342	745	532	71.4
	397	318	715	517	72.3
	411	343	754	536	71.0
	418	330	748	534	71.4
	405	330	735	547	74.4
	405	349	764	564	73.6
	456	370	816	....	....
	427	349	776	550	70.8
Mean	424	347	770	549	71.4
Females	407	337	774	522	70.1
	400	323	723	480	66.4
	394	311	707	468	66.4
	402	328	728	515	70.7
	408	333	741	504	68.0
	398	329	721	515	70.8
	403	307	710	505	71.1
	392	313	705	499	70.8
	410	....	....	509	....
	419	352	771	530	68.7
Mean	403	325	728	504	69.2
	Salish.				
Males	397	327	724	549	75.8
	406	334	740	549	74.1
	427	354	781	564	72.2
	477	383	860	621	72.2
	414	330	744	537	72.1
	407	....	....	524	....
	420	328	748	544	72.7
	465	365	830	600	72.2
	401	329	730	523	71.6
	424	349	773	543	70.2
Mean	423	344	770	555	72.0
Females	497	323	720	492	68.3
	408	321	729	533	73.1
	432	338	770	502	65.1
	398	328	724	....	....
	385	322	707	529	70.4
Mean	404	322	730	514	70.4

Arranging this to show variation in sex and the distribution of the indices, we have the following:

Table VI

Intermembral index.	♂	♀	♂ + ♀
65	..	1	1
66	..	2	2
67	..	..	..
68	..	2	2
69	1	..	1
70	2	4	6
71	4	1	5
72	6	..	6
73	2	1	3
74	3	..	3
75	..	1	1
Mean...	71.6	69.8	70.7

The average index, 70.7, for the Northwest coast races is higher than that given by Broca[1] or Flower[2] for Europeans, and is only exceeded by that given by Turner for the Eskimos and Lapps—73.4 and 72.8 respectively. The index given by Turner for the Australians is 68.7; for the Oahuans, 67.4; for the Maoris, 69.3. The highest intermembral index that I can find on record is that given by Turner of a female Lapp with an index of 74.9. He also records an index of 74.8 for a female Eskimo. In my table there are three instances where the index is 74 and two where it is 75. It is probable that this index of 75.8 (a Salish male) has never been exceeded.

Femoro-humeral Index.—This is determined by the formula $\frac{\text{length of humerus} \times 100}{\text{length of femur}}$. In both bones the maximum length is taken; these are given for the humerus in Table I and for the femur in Table V. In Table VII the femoro-humeral indices for both sexes of the two races combined are shown.

According to the combined results of Broca and Flower, the femoro-humeral index in Europeans is 72.5. This is not exceeded by the average of any races measured by Turner except the Eskimos and Lapps, which have the indices of 77.7 and 75.4 respectively. In my results there are seven indices which equal or exceed the index in the Lapps and one which surpasses the mean of the two Eskimos.

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[1] Bull. de la Soc. d'Anthrop., ser. 2, t. ii, p. 641, Nov. 21, 1867.

[2] Quoted from Turner.

Table VII

Humero-femoral index.	♂	♀	♂ + ♀
66	..	1	1
67	..	1	1
68	..	1	1
69	..	..	..
70	2	2	4
71	2	1	3
72	..	4	4
73	5	..	5
74	3	2	5
75	1	1	2
76	2	..	2
77	1	1	2
78	1	..	1
Mean...	73.6	72.0	72.8

Summary.—The Kwakiutl and Salish Indians of British Columbia have a radio-humeral index of 75.5, a tibio-humeral index of 79.1, an intermembral index of 70.7, and a femoro-humeral index of 72.8. These indices approach very closely, and indeed often equal, those which have been determined for the Eskimos, the Samoyeds, and the Lapps.

Scotch River Lore.—Near Dunskey, in the parish of Wigtownshire, is a stream which at the end of the last century was much resorted to for its health-giving properties. Visits were usually paid to it at the change of the moon. It was deemed especially efficacious in the case of rickety children, whose malady was then ascribed to witchcraft. The patients were washed in the stream and then taken to an adjacent cave, where they were dried.—*Mackinlay in Proc. Soc. Antiq. of Scotland, vol. xxx.*

THE MISSING AUTHORITIES ON MAYAN ANTIQUITIES

BY DANIEL G. BRINTON, M. D.

Now that the study of the antiquities of the Mayan tribes of Central America is attracting a respectable amount of attention in both America and Europe, it is worth while to call to mind those earlier students in the same field, the results of whose labors we know only by title or by references in later authors. It is very possible that some or all of their valuable writings exist in the old libraries of Spain or Italy, or in private collections of ancient houses or convents. The unearthing of Landa's manuscript by the Abbé Brasseur de Bourbourg and that of the *Relacion de la Villa de Valladolid* by Señor Marimon[1] are but examples of what has often been accomplished by persistent explorers of neglected corners of libraries. De Rosny picked the *Codex Peresianus* from a waste basket in the Bibliothèque Nationale of Paris!

These were accidents; but if one knows what to look for, the probability of success will be greater, and for that reason I propose in this article to mention the authors and titles of a series of works which we know were written upon the rites, customs, religions, and antiquities of the various tribes of the Mayan family previous to the present century, but whose present whereabouts are unknown. The points which I shall furnish will perhaps aid in the search for them.

The Mayan stock, I need hardly say, occupied three main contiguous areas—the peninsula of Yucatan, Guatemala with parts of Honduras, and most of the space now included in the Mexican states of Chiapas and Tabasco.[2] It is in this order that I shall group the missing works on the antiquities of the stock.

I. *Yucatan*.—In the first generation after the conquest there lived in Yucatan an Indian of noble birth, tracing his descent, indeed, to the ancient and royal "Tutul Xius."[3] He had been baptized "Gaspar Antonio." Quick in learning, he could write with almost equal facility the Maya, Spanish, and Latin, and through these qualifications he gained the position of government interpreter.

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[1] Of the date of 1579, and printed in the *Actas del Congreso de Americanistas*, Madrid, 1881, Tom. II, p. 167 sq.

[2] The best general sketch of the ethnography of the Mayan stock still remains that by Dr Otto Stoll, in his work *Zur Ethnographie der Republik Guatemala*, published in 1884.

[3] According to tradition the Xiu (or Tutul Xiu) was one of the two leading families in Mayapan, the capital of the ancient Maya Confederation. Their quarrels with the Cocom, the other aspirant to dominion, destroyed the capital and state, but the Xiu came out triumphant. *The Maya Chronicles*, p. 89, etc. (Philadelphia, 1882.)

At the request of the then governor of the province, Don Guillen de las Casas, he prepared a report on "The customs of the Indians of Yucatan"—*Relacion sobre las Costumbres de los Indios de Yucatan*—completing it in March, 1582.

In 1656 Father Cogolludo had the original of this report in his hands, and quoted from it freely in his *Historia de Yucatan.*[1] Bishop Carrillo y Ancona, in his history of the literature of the Maya language, asserts on the authority of "various authors" that it was printed in Mexico,[2] but this I believe to be an error. At any rate, whether in manuscript or print, it is one of the "missing" authorities, and as the product of a native would have peculiar interest.

One of the earliest of the missionaries was Brother Alonso Solana, who died in 1600, having lived about forty years in the province. He acquired an intimate knowledge of the Maya tongue, and composed a dictionary of it, which some say was printed,[3] but of which no copy is known. According to the testimony of one of his contemporaries, Father de Lizana, "he investigated thoroughly the antiquities of the Indians, and wrote much concerning them."[4] The three following titles are given of these writings, and they indicate their general scope:

1. *Noticias sagradas y profanas de las Antiguedades y conversion de los Indios de Yucatan.*
2. *Estudios historicos sobre los Indios.*
3. *Apuntaciones sobre las Antiguedades Mayas.*[5]

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[1] Diego Lopez Cogolludo, *Historia de Yucatan*, Tom. i, pp. 288, 293, etc. (I quote from the third edition, Mérida, 1867.)

[2] Carrillo y Ancona, *Historia de la Literatura Maya* in the *Revista de Merida*, 1870, p. 31. He makes the statement, "Segun el testimonio de varios autores," but does not name them.

[3] Dicese que se imprimió," says the Conde de la Viñaza in his *Bibliografia Española de Lenguas Indigenas de America*, p. 257 (Madrid, 1892), but who said so he does not add.

[4] "Averiguó mucho de las antiguedades destos Indios, y dexó mucho escrito." Fr. Bernardo de Lizana, *Historia de Yucatan*, p. 92. (Second edition, Mexico, 1893.) This is the work of which the Abbé Brasseur published extracts in his appendix to his edition of De Landa's *Relacion de las Cosas de Yucatan*, giving Lizana's work the erroneous title, "*Historia de Nuestra Señora de Itzamal.*"

[5] The first of these three titles is given by Beristain de Souza, *Biblioteca Hispano-Americana Septentrional*, Tom. iii, p. 152. The last two are added by Carillo y Ancona, *ubi suprá*, p. 319; on what authority he does not state A brief life of Solana is inserted by Lizana in his *Historia*, fol. 90 sq., and he is frequently referred to by Cogolludo in his *Historia*.

Evidently these would be of the highest importance if they could be recovered. The limited information in Lizana's History on the religion of the Mayas was drawn confessedly from this source, and evidently it was a small part of what this learned friar collected in that direction.

Another eminent Maya lexicographer was Father Antonio de Ciudad Real, who died in 1617 at the age of 66 years. His great work was entitled:

Gran Diccionario ó Calepino de la Lengua Maya de Yucatan.

It is described as being in six folio volumes, of more than 1,200 leaves, and rich in descriptions of the native rites and customs.[1] Two copies of it were prepared, one of which remained in Yucatan and is lost, while the other, according to the bibliographer Nicolas Antonio, was, when he wrote, in the library of the Duque del Infantado in Spain.

When in Spain in 1888 and 1893, I endeavored to trace that library. Some volumes of it were said to have gone to the *Real Academia de Historia*, but the bulk of the collection passed to the Duke of Ossuna, and by him was sold to the Biblioteca Nacional in Madrid. My inquiries, however, in both these institutions did not result in discovering the dictionary, though, as I was hurried, this fine work may well be hidden in their recesses.

Early in the eighteenth century a native of Castile, Brother Andres de Avendaño, went to Yucatan, and besides composing a dictionary and grammar of the Maya language wrote two volumes whose titles promise well to the antiquary. They are—

1. *Diccionario de nombres de Personas, Idolos, Danzas y otras Antiguedades de los Indios de Yucatan.*
2. *Explicacion de varios Vaticinios de los antiguos Indios de Yucatan.*

An advertisement for these appeared in the *Registro Yucateco* for 1845 offering a liberal sum for them, but without avail. They were probably sent to Spain.

Written in the eighteenth century, they could not have been drawn from original observation. The one on the prophecies (*vaticinios*) was most likely a discussion of those printed by

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[1] See Lizana, u. s., fol. 99; Cogolludo, Tom. II, pp. 121, 237; Carillo y Ancona, p. 322.

Lizana in his History, while the names of persons, idols, dances, etc., were gathered, I suspect, from the *Calepino* of Ciudad Real.[1]

II. *Guatemala.*—I now turn to the province of Guatemala. In its area were a number of Mayan tribes, the most important of which were the Cakchiquels, the Quiches, and the Tzutuhils. Their dialects were called the three "metropolitan languages" of the ecclesiastical diocese.

One of the earliest missionaries to this region was the Dominican brother, Domingo Vico. His work was at first among the Acalans of the lowlands of Tabasco, the Lacandons, their neighbors on the east, and later on in Vera Paz, where toward the close of his life he was prior of the convent of Coban, near which town of late years such beautifully decorated ancient vases have been found, the finest specimens, in my knowledge, of American ceramic art.

Vico was the author of many works in the native idioms, the most celebrated of which was his *Theologia Indorum*, a course of religious instruction for the natives in their own tongue. It was translated into various dialects, and a copy in the Cakchiquel is one of the precious manuscripts in the library of the American Philosophical Society, Philadelphia.

He is generally said to have been a bishop of some diocese, but the accounts are not clear. He was killed by the Lacandons in 1555.[2]

The missing work of Vico which would be the most desirable of all his writings to recover is that on the traditions, myths, and superstitions of the Indians:

Historia de los Indios, sus Fabulas, Supersticiones, Costumbres, etc.

This would be of inestimable value, coming from one so thoroughly acquainted with their tongues and in early contact with the tribes, and by it we might be able to settle the great controversy on the "vase of Chama."[1] It is mentioned by the historian Remesal, but I can give no later clue to its whereabouts.

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[1] Neither Bishop Carillo nor Brother da Civezza, the latter the author of the excellent *Bibliografia Geografica, Storica, Etnografica, Sanfrancescana* (1879), though mentioning Avendaño, adds anything about him beyond what is given by Eguiara y Eguren, the author of the *Biblioteca Mexicana* (Mexico, 1755), and who was bishop of Yucatan about 1750.

[2] Compare Beristain de Souza, Tom. III, pp. 272, 273, with Juarros, *Historia de Guatemala*, Tom. I, p. 320. The latter gives (probably from Remesal) a rather circumstancial account of his death.

Another sixteenth century writer, Brother Tomas Castelar, is stated to have composed a treatise on the idols of Guatemala:

Tratado de los Idolos de Guatemala.

What we know of this Dominican is that he was for a while lector of theology in the college at Puebla de los Angeles, and subsequently a missionary to various Indian tribes, and that he published in Mexico in 1580 a work entitled *Triunfos de los Martires del Orden de Predicadores.* The histories of the early missions in Guatemala do not record his labors in that field, so far as I have searched them, nor do later writers appear to have availed themselves of his treatise.

About 1625, Brother Salvador Cipriano, a Dominican, wrote a treatise said by some to have been entitled:

Libro de los Idolos de la Provincia de Zacapula, en Lengua Zacapula.

It is said to have been translated into Spanish by Father Juan Aillon, or under his direction. There are, however, literary doubts about this piece. Some writers give the title "de los *Indios*" instead of "de los *Idolos*," though in either case its antiquarian interest would be the same. So, also, it has been constantly asserted that the "Lengua de Zacapula" meant the Tzutuhil, spoken on the borders of the Lake of Atitan.[2]

This, I think, is an error. Santo Domingo Sacapulas is in the *partido* of Huehuetenango, and the dialect which has always been spoken there is Quiche. We should probably find in this work of Cipriano's, therefore, a variant of the myths and legends of the *Popol Vuh*, probably the earliest native manuscript of it.

The Dominicans were the most numerous in Guatemala, but a Franciscan seems to have been the first to write the history of the province. This was Brother Esteban Aviles, who about 1665 completed a volume with the following title:

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[1] So interestingly discussed of late by Seler, Schellhas, Förstemann, and Dieseldorf in the *Verhandlungen der Berliner Anthropologischen Gesellschaft, etc.*

[2] Mr E. G. Squier in his *Monograph of Authors who have written on the Languages of Central America*, p. 26 (New York, 1861), says: "Zacapula is another name for the Zutugil" (Tzutuhil). It is from the Nahuatl word *zacatl*, cornstalk, and was geographically applied to a Quiche locality. See Juarros, *Historia de Guatemala*, Tom. I, p. 121 and p. 68. This work therefore belongs in the linguistic bibliography of the Quiche dialect.

Historia de Guatemala desde los tiempos de los Indios hasta la Fundacion de la Provincia de los Franciscanos, Poblacion de aquellas tierras, Propagacion de los Indios, sus ritos, ceremonias, policia y gobierno.

Mr Squier says that this work was printed,[1] but the authority he quotes, Beristain, does not support his assertion, nor does any other bibliography. Father Da Civezza searched for it carefully in the Spanish libraries, but in vain,[2] nor is it quoted by Juarros, Pelaez, or any of the later historians of the province. Its title indicates the presence in its leaves of valuable ethnographic material, but I suspect that the manuscript fell into the hands of some Dominican, and the known jealousy at that time and place between the orders would suggest the result.

Another Franciscan, Brother Rodrigo Betancur de Jesus, wrote in the early years of the eighteenth century a treatise which, though probably not on the Mayan tribes, would be most desirable to recover.

The occasion of it was this: In 1703 the Bishop of Guatemala, Antonio Margil, heard reports of how paganism and sorcery were flourishing among the Indians of the province of Matagalpa, in Nicaragua. Taking with him a few zealous priests, he himself visited those parts. "In which expedition," writes Juarros, "he discovered innumerable sorcerers, fortune-tellers, and idolators, and succeeded in converting them, and in bringing them into the path of salvation."[3]

It is evident that it is to this saintly progress that the following work by Brother Betancur refers:

Tratado de las Supersticiones de los Indios de Matatgalpa, Xinotega, Muimui, y otros del partido de Sevaco, y de los diferentes enredos con que el Demonio engaña à los que se llaman Brujos.

All the places named are in the district (*partido*) of Matagalpa, which was peopled by various tribes of natives, the Matagalpan stock not being the most numerous.[1] A Nahuatl colony was south of them, and it is possible that these were the offenders. In any event, the recovery of this document would throw new light on aboriginal superstitions and probably on the cultivation of the secret rites of "Nagualism" in Central America.[2]

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[1] Compare Squier, *Monograph*, etc., p. 21, with Beristain de Souza, *Biblioteca*, etc., Tom. I, p. 113.

[2] Da Civezza, *Bibliografia*, etc., p. 29.

[3] Juarros, *Historia de Guatemala*, Tom. I, p. 309.

III. *Chiápas.*—The province of Las Chiápas was the home of the Tzentals, and the prevailing opinion now is that it was the cradle of Mayan civilization. Thither in legend came from the east the mysterious hero Votan, bringing with him the arts of life and the sacred mysteries of religion. There stand today as monuments of a glorious past the ruins of Ococingo, of the City of the Serpents, and of many another center of ancient population. Could we discover some early manuscript telling us the mythology of the Tzentals, how it would aid in the interpretation of the inscriptions of Palenque and Cintla!

But there exists not even the title of such a manuscript. There were, nevertheless, many such written in their own tongue by the natives themselves. Of this we are assured by Nuñez de la Vega, Bishop of Las Chiápas in and about 1690. He himself took pains to collect them with diligence, as he informs us, but with what purpose? Tell it not in Gath! To burn them! which he religiously did, "finding in them naught but vain fables and heathenish practices."[3]

So well did he do his work that forty years afterward when the diligent antiquary, the Cavallero Boturini, applied to the then bishop of the see for some examples of these writings, the answer he got was, "They are not to be found."[4] Thus these inestimable treasures perished at the hands of educated Europeans, governed by bigotry and superstition.

It is only from the latter half of the eighteenth century that I can refer to any manuscripts in this field. Several were discovered by Don Ramon de Ordoñez y Aguiar, resident in San Cristóbal, Chiápas, about 1780, an ecclesiastic of archeological tastes.

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[1] On this point I may refer to an article of mine on "The Matagalpan Linguistic Stock of Central America" in the *Proceedings of the American Philosophical Society* December, 1895.

[2] The extension of the native anti-Christian cult of Nagualism into Central America has been shown by abundant evidence in my treatise on the subject (*Nagualism*, pp. 65, Philadelphia, 1894).

[3] Nuñez de la Vega, *Constituciones Diocesanas del Obispado de Chiápas.* Preambulo (Roma, 1702).

[4] "Que no parecian." *Idea de una nueva Historia General de la America Septentrional*, p. 116 (Madrid, 1746).

He incorporated them in a long, rambling work entitled "History of the Creation of the Heaven and the Earth, according to the theory of the American Heathens."[1]

This was in two volumes, which after his death found their way to the city of Mexico, where the second volume was destroyed, all but a few leaves, and the first was saved from utter loss by the Abbé Brasseur, who copied it in full. His manuscript is now in the United States, and I have examined it carefully. It is a straggling paraphrase of the Popol Vuh, with many episodes, and was clearly borrowed from some copy of that remarkable compilation. It offers less that is new than I expected, and is scarcely worth publication in full, in spite of the reverence with which it is often quoted by Brasseur.

The second part probably contained what we should have preferred to read—that is, a curious manuscript in the Tzental dialect, written by a native to prove his descent from the hero-god Votan. We owe a description of this to Dr Felix Cabrera, who had it in his hands, and who asserts, on not convincing evidence, that it was "copied from the original in hieroglyphs shortly after the conquest."

It consisted of only "five or six folios of common quarto paper," and bore as its title the inscription, "Proof that I am a Serpent." Cabrera adds a brief epitome of its contents, but as he could not read Tzental, his statement must be taken "with reserve."[2]

From his description I am inclined to believe that this document belonged among some land titles, *titulos de tierra*, of the inhabitants of the village of Teopisca, where the descendants of Votan live to this day.[3] It is quite common to find such genealogical claims appended to these titles, as, for example, the well-known *Titulo de Totonicapan*, published by the Count de Charencey. They often have considerable antiquarian value.

It is obvious from the above list that the early missionaries did not always neglect the pagan rites and histories, and had we their manuscripts complete our knowledge of Mayan antiquities would be greatly enlarged.

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[1] *Historia de la Creacion del Cielo y de la Tierra, conforme al Sistema de la gentilidad Americana.* The full title occupies nearly a page in Brasseur's *Bibliothèque Mexico-Guatemalienne*, p. 112 (Paris, 1871).

[2] Dr Paul Felix Cabrera, *Teatro Critico Americano, or a Critical Investigation and Research into the History of the Americans*, pp. 32, 33 (Eng. Trans, London, 1822). Ordoñez in his MS. speaks with great contempt of this "abortion" of Cabrera's.

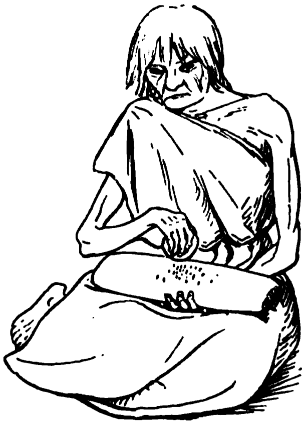
[3] Pineda, *Descripcion Geografica de Chiápas*, p. 53.

A word in conclusion may be said of the amount of information contained in the unpublished dictionaries of the Mayan dialects, those, I mean, which have been preserved.

I have in my collection three of these of the Maya of Yucatan, those prepared at the convents of Ticul, Motul, and San Francisco. There is in them disappointingly little on the native pagan culture. This is also true of the dictionary of the Tzental idiom, by Father de Ara, which came to me from the Brasseur library, and of the large dictionary of the Cakchiquel, by Father Coto, in the library of the American Philosophical Society.

It was the general rule with the makers of such dictionaries to avoid retaining words of the native dialects which were closely associated with heathen practices, their effort being to lead the Indians to forget all such customs and ideas. Hence the poverty of their vocabularies for antiquarian purposes.

STONE-WORKING AT TEWA.[1]—The village of Hano or Tewa is situated on the Walpi mesa in Tusayan, Arizona. In the summer of 1896 the writer quite unexpectedly observed the process of dressing down one of the oblong hand-stones used by the Hopi women in grinding corn. While sitting in the house of Kutchvei, awaiting the arrival of Nampeo the potter, an old woman was seen to draw from beneath her rug an unfinished mealing stone. This she laid across her knees and, producing a hammerstone, began to peck the corn-grinder into shape by rapid and continuous blows, raising an ear-torturing noise. The grinder had previously been subject to much work during the old woman's leisure moments. The observation is a most interesting one, throwing light on an ancient process, and giving meaning to the hammerstones in the fabrication of grinders, metates, and other utensils made of granular materials found in the prehistoric pueblos. On the "Stone Hammer and its Various Uses," see J. D. McGuire, *American Anthropologist*, 1891, p. 301. WALTER HOUGH.



A Tewa stone-worker

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[1] Published by permission of the Secretary of the Smithsonian Institution

BOOK REVIEWS

Navaho Legends. Collected and translated by Washington Matthews, M. D., LL. D., Major U. S. army, ex-president of the American Folk-lore Society, etc. With introduction, notes, illustrations, texts, interlinear translations and melodies. Boston and New York, published for the American Folk-lore Society by Houghton, Mifflin & Company. 1897. 8°. viii, 299 pp.

This work by the distinguished Navaho specialist, forming volume V of the publications of the American Folk-lore Society, is probably the best tribal study ever published. It consists of a descriptive and historical account of the tribe, followed by three legends, 65 pages of notes and texts, phonographic transcriptions of native melodies, bibliography, and index.

In the introduction the author gives a concise account of the important tribe of the Navaho living in northern New Mexico and Arizona, their weaving and metal-working, their stock-raising, house-building, home life and ceremonies, and describes them as a notably industrious and intelligent people. The small value of the ordinary negative testimony of superficial observers is shown by his reference to one writer, who states that the Navaho had no knowledge of their origin and apparently no religion, and that their singing was but a succession of grunts, whereas the author proves beyond question that their religious system and traditions are remarkably elaborate and detailed, and asserts that they have "thousands of significant songs or poems" handed down through generations, not to speak of improvised songs, which they are adepts at composing. He states that the Navaho woman is usually songless. While this may be true as to ordinary songs, they certainly have lullabies, as the writer found while sojourning in Navaho camps some five winters ago.

The organization of the Navaho gentes, nearly all of which have geographic names, would seem to indicate that the system in this tribe, as among others of the plains and the extreme west, is based on principles different from those recognized among the timber tribes of the east. The meaning of the popular name *Navaho* is left in doubt, with the probabilities in favor of its derivation from the Spanish *navaja*, a clasp-knife or razor. With all the plains tribes the gesture sign and frequently the spoken name for both Navaho and Apache signifies "knife whetters."

Of the three legends, all abounding in valuable ethnologic references, the most important is that of the origin of the Navaho, in which it is clearly shown that they are a much mixed race, the result of successive graftings from diverse stocks and languages upon a nucleus of Athapascan origin. The time of the consolidation of this nucleus is given by the Navaho as "seven ages of old men" before 1884, some claiming such an age as a definite period of 102 years, while others estimate it at only 70. The writer's experience has been that Indians age rapidly, and that in aboriginal chronology the shorter period is usually the safer one. Hodge, who has investigated the subject from historical tally dates, makes the event "not earlier than the latter part of the fifteenth century." This is probably near the truth. The legends, with the explanatory notes, contain numerous interesting parallels with custom and myth in other tribes, showing that the line of aboriginal thought and action is almost universally the same. The eleven melodies are an important contribution to the study of primitive music. A bibliography by F. W. Hodge, an authority on the Spanish southwest, adds value to the work.

The typography and general make-up are in keeping with the worth of the volume. JAMES MOONEY.

Professor William Z. Ripley is publishing in the *Popular Science Monthly* a sociological study on the Racial Geography of Europe. This is a timely production.

It was Virchow who intimated that before students of anthropology in Germany could be certain regarding the tribal divisions of their prehistoric ancestors they should find out who the modern Germans are or who themselves might be. In all studies of this character, language, nationality, and race are likely to be confounded. Very few writers on this part of anthropology have been careful to discriminate these separate classification concepts. Professor Ripley observes that all over Europe population has been laid down in different strata. In the East the layers are recent and distinct; in the West they have become metamorphosed by the fusing heat of nationality and the pressure of civilization. To change the figure, this great body of population reveals itself in constant motion. Internally, currents and countercurrents sweep hither and thither, rising and falling, with here and there an eddy where the population is quiescent.

While Professor Ripley disclaims any essential bond between language and nationality, he very wisely intimates that the limits of intelligible speech and common tradition do fix the boundaries of peoples along nearly the same lines. Assimilation in blood often depends on identity of speech, and political frontiers upon blood kinship.

In the second paper of this series the subject of cranial indices is again brought to the front. This time the researches are not based upon the crania furnished by ancient or old cemeteries, but upon the measurements taken from living population.

A Mercator's map of the world shows that in Australia and Melanesia, Hindostan, Arabia, Africa, Scandinavia, the British Isles, Iceland, among the eastern Eskimo, and in eastern Brazil dolicocephaly prevails; in Asia north of the Himalayas and the Chinese boundary, in Europe east of the Atlantic states, and in the mountain tribes of North and South America broad heads, or brachycephaly, prevails. Professor Ripley insists that upon these characteristics are to be based correct deductions with reference to the original races from which the Europeans have been derived by descent.

After the discussion of the cephalic indices, the question of color in the eyes, the hair, and the skin claims attention, and upon this point the author is certain that there is no difference in anatomical structure corresponding to the differences above indicated. A map of the world accompanies the discussion upon this topic, and at once it is seen that within the limits laid down by the author this assertion is true. Four classes of color groups are distinguished—the black, the brown, the yellow, and the white. In comparing color groups with the index groups, the author elaborates the opinion that in Europe there is a central region among the Alps into which oldest populations have been driven and side-tracked. While the distinctions of race are indicated by the proportion of the length to the breadth of the head, climate, economic status, or habits of life are competent to produce changes in the color of the hair and eyes. These questions are minutely tested in the discussion of the population in Black Forest and eastern Switzerland.

The question of stature in its relation to color and indices is discussed in the fourth paper, and a map of the world is presented in order to exhibit this characteristic among different races. Inasmuch as environment acts directly upon stature through food supply and economic prosperity, results obtained through this agency become modified and fixed by artificial selection, by occupations, and by the nature of employment. A general discussion upon stature in its relation to the original races is supplemented by a minute study of peoples in southwestern Europe, in Brittany, Switzerland, and the Tyrol.

The fifth paper sums up the argument of its predecessors with reference to nationality, language, race, color, stature, and cranial indices. From this survey the author concludes that there is indubitable evidence of at least three distinct races in Europe, each possessed of a history of its own and each contributing something to the common product, population as we see it today. These three races are the Teutonic, the Alpine or Keltic, and the Mediterranean, and for each one of these three the author distinguishes characteristics of the head, face, hair, eyes, stature, and nose. It is proposed to base upon these three original racial types a study of the nationalities of Europe, and the combination of these elements therein, beginning with the French, because this is the only nation in Europe compounded of all three racial elements. In addition, there is living in France today an older population with an unbroken ancestry reaching back to a prehistoric age.

The application of anthropometry to large bodies of men promises to remove from that science some of the obscurity of which its students have complained. Dr Ridolfo Livi has just published, under the direction of the Italian war department, an interesting study entitled *Antropometria militari*, based upon measurements of Italian recruits from 1859 to 1863, they being 10 percent of the total population of Italy and 26.4 of the total male population. He finds the average height to be 1.645 m., varying by race, altitude, and education, those of the higher levels and classes being the taller. Coloration of eyes and hair varies with stature, blondes being the taller. Dwellers in cities are darker than country people. The cephalic index averages 82.73 and affords a good guide to the different populations, in Piedmont rising to 85.9 and in Sardinia falling to 77.5. Nevertheless, dolichocephaly is more common in individuals of lofty stature.

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WHILE OPENING some burial mounds in the neighborhood of lakes Apopka and Butler, in southern Florida, in February, 1896, I discovered a cooper's adze in the lower part of one of the mounds. This implement was entangled in the roots of a tree that had grown upon the mound. The position of the adze in the mound negatives the idea of an intrusive burial, and the condition of the mound clearly showed that the ground had not been disturbed since the tumulus was originally built. A great many colored glass beads were also found in it. These discoveries prove that this mound, at least, was made subsequently to the advent of Europeans.

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SCOPELISM[1]

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The word which forms the title of this essay is not, I believe, to be found in any English dictionary. It is somewhat surprising that it should have been omitted from that very thorough piece of work, the Century Dictionary, for the word in its French form is given by Littré, and in its original in the larger Greek lexicons. Ducange also, in his glossary of mediæval and low Latin, gives it with a quotation and explanation, which I noted down a few years ago, and to which illustrations have been added as occasion afforded. Professor Chauvin, of the University of Liége, some time since sent a learned dissertation on the subject to the Royal Academy of Sciences of Belgium, and to it I am indebted for many references.[2]

There is no doubt that the first mention of scopelism is to be found in Ulpian. He was a famous jurist in the beginning of the third century, and his writings form about one-third of Justinian's Digest. It was while in the service of the Emperor Caracalla that he wrote his treatise *De officio proconsulis*, Of the duties of a proconsul. In the ninth book of his work he speaks of a crime peculiar to the Arabs, which he terms *Scopelismon*. The following is a literal translation of the passage:

"There are those who, after the manner of the provinces, are accustomed to employ threats; as, for example, in the province of Arabia they speak of the crime of scopelism (*σκοπελισμόν*) of which the particulars are these: they are for the most part enemies who scopelise (σκοπελίζειν), a field—that is, to place stones as a warning that if any one should cultivate that field he would die a violent death by the arts of those who placed the stones; which thing produced so much fear that no one dared to go to that field, fearing the cruelty of those who had made the scopelism. The authorities are accustomed to follow this matter up severely, even to inflicting the penalty of death, for the thing itself implies a threat of murder."

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[1] A paper read before the Anthropological Society of Washington, April 20, 1897.

[2] Chauvin (Victor): Le scopélisme, Bull. Acad. Roy. des Sciences [etc.] de Belgique, Bruxelles, 1892, 3 series, t. XXIII, 23–57.

It is clear, then, that scopelism consisted in placing stones, in a form which shall be considered later, as a warning to all that an attempt to cultivate the field thus scopelised would bring death to the intruder. The crime was regarded as so serious that the proconsul or governor of the province had the right to punish it rigorously, even by the pain of death.

A certain Clodius, in 1730, wrote a dissertation upon scopelism, which was published at Leipzig. He takes the ground that the ceremonial was not merely a menace, but a practice of magic. Del Rio, the celebrated Jesuit of Anvers, whose six books of magical disquisitions were published in 1599, had preceded him in this view. There is, however, nothing in Ulpian's description which justifies the suspicion that any magical incantations accompanied the proceeding. He states with entire clearness that the stones were placed on the field as a menace which threatened death to him who disregarded it.

There is a curious illustration of the belief that magical rites accompanied this mysterious ceremonial known as scopelism to be found in Gabriel Naudé's "Apology for great men suspected of magic," published at Amsterdam in 1712 (page 38). He relates an interesting incident from Pliny's Natural History, book XVIII, § 8. He begins (I translate it into English): "A peasant, one Furius Cresinus, was accused before the Roman people of having practiced *scopelism* on his neighbors' fields, since though they were longer and broader than his they did not yield such fine crops." In a foot-note he adds: Scopelism consisted in casting stones charmed by magic into a neighbor's field. It is further asserted that these charmed stones had power to cause such evil to those who uncovered them that death was the consequence. This sorcery was [first] practiced in Arabia.

Naudé did not obtain this account of the magical qualities of the stones made use of in scopelism from the passage in Ulpian already quoted. Neither is there anything in the story related by Pliny which justifies such a statement. It is probable that he took the account from the writings of Del Rio. There are so few allusions to scopelism in history or literature that it was worth while to refer to this passage in Naudé, even though it is necessary to show its inaccuracy. The trial of the freedman as given by Pliny is so vividly related that it will bear repeating. He says:

"I cannot refrain from taking the present opportunity of quoting one illustration afforded us by ancient times, from which it will be found that it was the usage in those days to bring before the people even questions connected with the various methods employed in agriculture, and it will be seen in what way men were accustomed to speak out in their own defense. C. Furius Cresinius, a freedman, having found himself able, from a very small piece of land, to raise far more abundant harvest than his neighbors could from the largest farms, became the object of very considerable jealousy among them, and was accordingly accused of enticing away the crops of others by the practice of sorcery. Upon this a day was named by Spurius Calvinus, the curule ædile, for his appearance. Apprehensive of being condemned, when the question came to be put to the vote among the tribes, he had all his implements of husbandry brought into the Forum. together with his farm servants, robust, well-conditioned, and well-clad people, Piso says. The iron tools were of first-rate quality, the mattocks were stout and strong, the plow-shares ponderous and substantial, and the oxen sleek and in prime condition. When all this had been done, 'Here, Roman citizens,' said he, 'are my implements of magic, but it is impossible for me to exhibit to your view or to bring into this Forum those midnight toils of mine, those early watchings, those sweats, and those fatigues.' Upon this, by the unanimous voice of the people, he was immediately acquitted. Agriculture, in fact, depends upon the expenditure of labor and exertion; and hence it is that the ancients were in the habit of saying, that it is the eye of the master that does more toward fertilizing a field than anything else."[1]

One James Reid was tried for sorcery at Edinburgh on the 21st of July, 1603. Dalzell, in his "Darker Superstitions of Scotland," Glasgow, 1835, gives a summary of the proceedings taken from the records of the court of judiciary, and he adds a section headed "Scopelismus," in which he says: "Satan amidst familiar intercourse with James Reid, 'inchantit him nyne stanes quhilke the said James cuist upon David Libbertoune's landis for destruction of his coirnes.' Is not this," he continues, "a relic of the Scopelismus of ancient nations—an example of the Deity's injunction, through the mouth of Elisha to the Jews, that they should 'mar many good pieces of land with stones?'"

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[1] Pliny, Nat. Hist., B. XVIII, 8. Bohn's edition.

This illustration of Dalzell's is wrongly taken, as we shall see presently when we come to the passage quoted. He goes on to say:

"The stones cast by the Scottish sorcerer were either to render the land barren or to injure the crop. But few illustrations from foreign or domestic history throw any light on so obscure a subject. Gothofredus interprets the Roman law as only indicating symbolic menaces of treacherous machinations against the safety of the obnoxious person. But he quotes the work of another author, Thebesius, who seems to entertain a different view of the offense by implicating superstition along with it, for he considered something magical connected with the stones, called *stone birds* by the peasants, who were wont to avert the scopelismus of their neighbors yearly, on St. Peter's day, by a solemn formula. The latter may be judged to correspond with an exorcism."[1]

It seems probable that St. Peter's day was selected for this formula on account of his name, Peter being derived from πετρός, a stone or rock. "On this rock," said Christ, referring to Peter, "I will build my church."

Some other commentators have supposed that scopelism meant the deposit of stones on a field in such quantity as to render it incapable of cultivation. This was undoubtedly an ancient custom, forming a part of the means by which in time of war the enemy's country might be despoiled and his sources of future supplies cut off. The prophet Elisha, when foretelling to the kings of Judah, Israel, and Edom that they should defeat the Moabites, said to them:

"And ye shall smite every fenced city, and every choice city, and shall fell every good tree, and stop all wells of water, and mar every good piece of land with stones."

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[1] Dalzell, p. 385.

After the Israelites, in fulfillment of this benevolent prophecy, had smitten the Moabites with great slaughter, the account goes on to say:

"And they beat down the cities, and on every good piece of land every man cast his stone and filled it."[1]

It is not difficult to imagine that an army provided with stones for the purpose might so cover the fields as to ruin the growing crops and make the soil useless until after the expenditure of much labor in removing the encumbrances. There is an allusion to the custom in Ecclesiastes, iii, 5, where it is said, "There is a time to cast away stones, and a time to gather stones together." In Job, too, in the poetic language characteristic of that beautiful legend, the fortunate man is told:

"At destruction and famine thou shalt laugh; neither shalt thou be afraid of the beasts of the earth. For thou shalt be in league with the stones of the field; and the beasts of the field shall be at peace with thee."[2]

This theory of the meaning of scopelism, while ingenious and interesting, is certainly at variance with the passage in Ulpian, which distinctly speaks of stones being placed "as a warning," *lapides ponere indicio futuros*, and the extreme gravity of the crime is asserted, inasmuch as it implied a threat of murder.

Another critic suggested that scopelism consisted in the erection of a stone pile as a place of outlook from which the intending cultivator might be readily seen and advantageously attacked. There is some color for this view in so far as the meaning of σκοπελός, the root word, extends. It implies a rock, a peak, a headland, a promontory, and the Latin form *scopulus* has the same application; but the language of Ulpian is not susceptible of such an explanation.

In all ages and among all peoples the custom has prevailed of heaping stones to mark the grave of a murdered man, of one who has committed suicide, or of a great criminal. It has been generally supposed that the purpose was to show abhorrence of a crime, but it is probable that it was done to keep down the restless body of the man who either by his own act or by the sudden attack of his enemy was

> "Cut off even in the blossoms of his sin,
> Unhousell'd, disappointed, unannel'd."

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[1] 2 Kings, iii, 19, 25.

[2] Job, v, 22, 23.

This despairing cry of the unhappy ghost brings to mind the enquiry of Hamlet in his first interview with his father's spirit:

> Why the sepulchre
> Wherein we saw thee quietly inurn'd,
> Hath oped his ponderous and marble jaws
> To cast thee up again.

It was a part of the popular belief that the man who had perished without receiving the last rites of religion could not be restricted to his grave, but with the inconsistency of fear the heap of stones was piled over his body in the hope of preventing visits which were often hostile and always terrifying.

The cairn then was erected to protect the living as well as to signalize where the dead lay buried. In like manner, down to recent times in England, the suicide was buried where four cross-roads meet, without a coffin or shroud, without funeral rites, and with a wooden stake driven through his body into the soil beneath. This was not done to add especial marks of ignominy to the interment of the self-murderer. As he necessarily died in mortal sin, the stake which nailed him in his grave was to prevent the foul fiend from carrying off the body which was his legitimate forfeit, and the intersecting roads formed the figure of a cross, which, with kindly superstition, it was thought might have some protecting power. It was also not unusual for a cross to have been erected at such a site.

A remarkable illustration of this popular credence in the power of the fiends to carry off the bodies of those who died unabsolved, and of the precautions that might prevent it, is to be found in the story of the Witch of Berkeley, which Southey immortalized in a ballad. The original account is given by the old chronicler, William of Malmesbury, who wrote his history, in Latin, in the early part of the twelfth century. The ancient historian asserts that he received the account from one of his own acquaintances, who was an eye-witness, and whom he says he "would have been ashamed to disbelieve." Thomas Wright, in his "Narratives of Sorcery and Magic," gives the following summary of the tragic occurrence:

"No sooner had her unearthly master given the miserable woman warning that the hour had appeared when he should take final possession than she called to her death-bed her children and the monks of a neighboring monastery, confessed her evil courses and her subjection to the devil, and begged that they would at least secure her body from the hands of the fiends. 'Sew me,' she said, 'in the hide of a stag, then place me in a stone coffin, and fasten in the covering lead and iron. Upon this place another stone, and chain the whole down with three heavy chains of iron. Let fifty psalms be sung each night and fifty masses be said by day, to break the power of the demons. If you can thus keep my body three nights, on the fourth day you may securely bury it in the ground.' These directions were executed to the letter; but psalms and masses were equally unavailable. The first night the priests withstood the efforts of the fiends; the second they became more clamorous, the gates of the monastery were burst open in spite of the strength of the bolts, and two of the chains which held down the coffin were broken, though the middle one held firm. On the third night the clamor of the fiends increased until the monastery trembled from its foundations, and the priests, stiff with terror, were unable to proceed with their service. The doors at length burst open of their own accord and a demon, larger and more terrible than any of the others, stalked into the church. He stopped at the coffin. and with a fearful voice ordered the woman to arise. She answered that she was held down by the chain; the demon put his foot to the coffin, the last chain broke asunder like a bit of thread, and the covering of the coffin flew off. The body of the witch then arose, and her persecutor took her by the hand and led her to the door, where a black horse of gigantic stature, its back covered with iron spikes, awaited them, and, seating her beside him on its back, he disappeared from the sight of the terrified monks. But the horrible screams of his victim were heard through the country for miles as they passed along."

An interesting historical incident, which describes the death of Manfred, King of Naples, seems also to bear upon this part of the subject. When that monarch was defeated by Charles of Anjou, near Benevent, in 1266, determined not to survive the loss of his kingdom, he rushed madly into the fight and perished. It was not until three days later that his body was discovered under heaps of the slain. By order of the papal legate it was refused Christian burial, as Manfred had been excommunicated, and the body of the warrior was consigned to a hole near the bridge of Benevent. As the French army passed by the spot, inspired by the remembrance of his valor, every soldier dropped a stone upon the humble grave, and a rude but stately monument was the result. The widespread belief in the danger of the unabsolved body from fiendish malice had probably some part in the formation of the pile. His body was not destined to remain under it, for the bishop of Cosenza, by direction of Pope Clement IV, caused the cairn to be removed and the relics of the hero were buried on the banks of the river Verde with "extinguished torches" and without funeral rites. Dante, in his Purgatory, describes his meeting with Manfred, when the latter relates his tragic story, concluding thus:

Most horrible indeed had been my crime;
  But goodness infinite has arms so large
  They can embrace whoe'er returns to him.
Cosenza's bishop, when on Clement's charge,
  He chased my dust in anger, had he read
  This text of mercy in God's Bible's marge,
My scattered bones above the bridge's head
  Would still be lying near to Benevent,
  Safe in the keeping of its storm-built bed.[1]

Sir Walter Scott, in the Lay of the Last Minstrel, tells how the famous wizard, Michael Scot, was buried in the chancel of Melrose Abbey in such wise that the red cross of St. Andrew, in the east oriel window, should throw its protecting reflection on the grave. The monk of St. Mary's Aisle relates how he—

dug his chamber among the dead,
Where the floor of the chancel was stained red,
That his patron's cross might over him wave
And scare the fiends from the wizard's grave.

This famous Michael Scot was not a mere legendary character. He may take rank with his contemporary, the English Roger Bacon—they were born in the same year, 1214—men whose learning, unusual for their time, caused them to be regarded as possessed of supernatural knowledge, and whose intellectual supremacy led them to attempt its possession. There is still extant, though of extreme rarity, a treatise by Michael Scot on Physiognomy and Some Philosophical Subjects, which was first printed in 1477.

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[1] Dante: Purgatory, canto III (Minchin).

Many analogous beliefs are to be found in the strange legends which relate to vampyrism.

Dismissing this interesting subject of the two-fold purpose of a cairn, it is sufficient to repeat that such a heap of stones in all ages and in all countries indicated a violent death. The true explanation of the heaped-up stones would seem to be that it was a cairn—a menace of death to the violator of the scopelised field. Of like nature is the coffin which figures on the missives sent by the Kuklux, the White Caps, and other lawless ruffians, and the skull and crossbones on the pirate's flag. Professor Chauvin coincides in this theory.

The term scopelism is found only in the treatise of Ulpian, in dictionaries which have quoted from him, and in one or two treatises already referred to. Chauvin mentions a rather rare book which he had seen, the title of which was: *L'injuste locataire détrompé, ou catéchisme pour inspirer de l'horreur de la coutume fatale appelée scopéle ou scopélisme*, par une curé de Hesbaye (Jean Herbeto) à Liége, 1706, small 8vo, 62 pages.

Hesbaye is one of the most fertile arable regions of Belgium, and it seems from the catechism of this curate that the tenants who, failing to pay their rent or from bad management of their farms, had been evicted, used violence to prevent the new tenant from taking possession. He tells them that in this they are as wicked as the Arabs. It is obvious that the good curate had seen this uncommon word scopelism in some commentary on Justinian's Digest.

A somewhat analogous offense to scopelism existed in Germany under the title of *Landzwang*. In the penal code of Charles the Fifth, known as the famous Carolinian code, Landzwang is defined as a threat on the part of dangerous outlaws to commit a crime, that crime having relation to agriculture and the rights of owners. In another section it is spoken of as "oppression, extortion of a country by outlaws," and it further provides that "as soon as they are brought to prison they shall be put to death by the sword as Landzwingers." These offenders seem to have been ordinary ruffians who oppressed the cultivators of the soil in various ways.

General Charles Hervey, an officer of the British government in India, in his account of his efforts to suppress the murderous Thugs and Dacoits, mentions an incident in which stones were associated with a supposed menace. Under date of April 27, 1867, he remarks:

"The first of the milestones leading out of Delhi along the grand trunk road, in the direction of *Kurnál*, was observed this morning to be smeared with a reddish color. This has lately happened at *Meerut* and other places, and on the gateway pillars of European residents—the work, I apprehend, of local *Budmaashees*, whose object is to create a sense of something being intended. I give it no other importance. The mutiny is too recent to be readily forgotten, or for any attempt to reënact anything in that way so soon. Hereafter we may look for its occurrence."[1]

In southern India it is not unusual to see in the field of a ryot or peasant five stones placed in a row and daubed with red. They are regarded as the guardians of the field.

Scopelism has a definite purpose—to forbid the conversion of pastoral into arable lands, under penalty of death, the threat being signified by the ominous pile of stones which gave rise to the name. It is not difficult to understand the reason for this aversion to the cultivation of the soil. The Arabs were a pastoral people of wandering habits, and fenced fields and crops of grain deprived them of so much opportunity for pasture. It was the old contest which began between Cain and Abel—the nomad opposing the tiller of the soil. The present generation has witnessed the like struggle between the Indians and the pioneer farmers, and the cowboys of today cut the barbed-wire fence which prevents their cattle from pasturing on the cultivated meadow-lands of the west, risking their lives in the lawless act.

Another phase of the same contest was the tyranny of the early Norman kings of England and of the feudal aristocracy of later times, by which vast tracts of land were forbidden to be cultivated in order that the wild animals might be preserved for the sports of the lordly owners of the soil.

There was yet another form assumed by this opposition of interests in which, as asserted, rustic habitations and even towns disappeared before the encroachments of the pastoral enemy. The effect produced on the morals of the people by this condition of things is described by Sir Thomas More in his Utopia with characteristic vividness.

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[1] Some records of crime, etc., by General Charles Hervey (sometime general superintendent of the operations for the suppression of Thuggee and Dacoitie in India). London, 1892, II, 11.

. . . "But yet this is not the only necessary cause of stealing. There is another which, as I suppose, is proper and peculiar to you Englishmen alone. What is that? quoth the Cardinal. Forsooth, my lord (quoth I), your sheep that were wont to be so meek and tame, and so small eaters, now, as I heare say, be become so great devourers and so wild that they eat up and swallow down the very men themselves. They consume, destroy, and devour whole fields, houses, and cities. For look in what parts of the realm doth grow the finest and therefore dearest wool, these noble men and gentlemen, yea, and certain Abbots, holy men, no doubt, not contenting themselves with the yearly revenues and profits that were wont to grow to their forefathers and predecessors of their lands . . . leave no ground for tillage; they inclose all into pastures, they throw down houses, they pluck down towns, and leave nothing standing but only the church, to be made a sheephouse. . . . Therefore that one covetous and unsatiable cormorant and very plague of his native country may compass about and inclose many thousand acres of ground together within one pale or hedge, the husbandmen be thrust out of their own, or else either by *coveyne* and fraud or by violent oppression they be put besides it, or by wrongs and injuries they be so wearied that they be compelled to sell all; by one means therefore or by other, either by hook or crook, they must needs depart away, poor, silly, wretched souls. . . . Away they trudge, I say, out of their known and accustomed houses, finding no place to rest in. All their household stuff . . . they be constrained to sell for a thing of nought, and when they have wandered abroad till that be spent, what can they then else do but steal, and then justly, pardy, be hanged, or else go about a begging."

Having thus shown how the converting fields and farms into pasture lands resulted in the production of thieves, he goes on to speak of their consorting with vagabonds, and treats of the matter in a style which might become our own day. He denounces the prodigality of the times and says: "Now . . . harlots, stews, and wine-taverns, ale-houses, and tippling-houses, with so many naughty, lewd, and unlawful games, as dice, cards, tables, tennis, bowls, quoits, do not all these send the haunters of them straight a stealing when their money is gone? Cast out these pernicious abominations, make a law that they which plucked down farms and towns of husbandry shall reëdify them, or else yield and uprender the possession thereof to such as will go to the cost of building them anew. Suffer not these rich men to buy up all, to ingross and forestall, and with their monopoly to keep the market alone as please them. Let not so many be brought up in idleness, let husbandry and tillage be restored, let cloth-making be renewed, that there may be honest labour for this idle sort to pass their time in profitably. . . . Doubtless, unless you find a remedy for these enormities, you shall in vain advance yourselves of executing justice upon felons."

It is to be observed that Ulpian intimates that it was "for the most part enemies," *plerumque inimici*, who practiced scopelism; but this may imply that quarrels over the meditated innovation had preceded the ceremonial threat. It is doubtful whether these words really belong to the text, as in other manuscript copies of Ulpian's treatise they do not appear.

History does not give us much information concerning the Arab tribes before the introduction of Islamism, but occasional allusions show that they were a fierce and revengeful race. The Korân contains many denunciations of the immoralities and cruelties of these pagans, as they are termed. There is an interesting allusion in the Mishnah to a custom which prevailed among them of erecting a cumulative heap of stones. The Mishnah was a code of laws drawn up by the Jews in Galilee about the second century of the Christian era and completed three hundred years later. The Margamah, in the passage referred to, was a heap of stones, sometimes put together under a sacred tree, and the cult consisted in throwing a stone on the heap in proof of a visit to the spot. It is thought to be referred to in the book of Proverbs, XXVI, 8, where it said, "As he that bindeth a stone in a sling, so is he that giveth honor to a fool." The gloss on this is, "or putteth a precious stone in a heap of stones;" and the version of the Vulgate is, "as one who throws a stone on a Margamah." The revised version gives it thus: "As a bag of gems in a heap of stones, so is he that giveth honor to a fool."[1]

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[1] "The ordinary artificial mark of a Semitic sanctuary was the sacrificial pillar, cairn, or rude altar. The sacred fountain and the sacred tree are common symbols at sanctuaries, but they are not invariably found, and in most cases they have but a secondary relation to the ordinary ritual. In the more advanced type of sanctuary, the real meeting-place between man and his god is the altar. The altar in its developed form is a raised structure upon which sacrifices are presented to the god." Lectures on the religion of the Semites. First series: The fundamental institutions. W. Robertson Smith. New York [London], 1889, p. 183.

It was a belief of the ancient Arabs that the spirit hovered around the grave of its mortal body or the stones which indicated it, in the shape of an owl. If the tenant of the grave had been murdered the bird continually cried *Eskuni* (give me drink), until the blood-money was paid or the crime was avenged. This is mentioned by Conder in his book on Syrian Stone-lore. These Arab superstitions have some interest in connection with their dangerous custom of scopelism.

There is another example of what I have termed a cumulative stone-cult. In New Mexico there is a stone of large size which it is the duty of every visitor to the locality to push forward a space. What the legend is that necessitates this performance I have not been able to discover.

Stones in their uncarved or rudely carved state figure largely in archeology and folk-lore, and it seemed to me that this very curious and little known custom known as scopelism was worth preserving in recorded shape.

THE HAUSA ASSOCIATION of London, organized in November, 1891, aims "to promote the higher interests of the Hausa people by providing (in continuation of the work begun by the Reverend John Alfred Robinson) for a scholarly and scientific study of the Hausa language, and for the translation of the Scriptures and other appropriate literature into their tongue." Upward of £1,500 have been raised to prosecute the work of the association in studying the language of the Hausa people of western central Africa, whose population is estimated at 15,000,000. Hausa is the *lingua franca* of the whole of the central Sudan, extending from the Sahara to the pagan tribes near the Gulf of Guinea and from the Egyptian Sudan to the French Sudan. A number of Hausa manuscripts, prepared by Reverend Charles H. Robinson, are already in hand, and a sufficient body of data for the publication of an adequate Hausa grammar has also been collected. The association has endowed for three years a lecturer in Hausa in the University of Cambridge and a post-graduate scholarship for Hausa at Christ's College in the same university.

F. W. H.

NEW GEORGIA EARRINGS.—The most striking ornament in New Georgia is the large earring. A piece is cut out of the lobe of the ear during early youth and the ring of flesh thus formed is gradually increased in circumference by the insertion of a strip of banana leaf, which, wound like a watch spring, keeps the lobe perpetually distended. Eventually a circle of wood occupies the hole, or, as I have seen, a disc of ebony, inlaid with mother-of-pearl, sometimes even a circular trade looking-glass. The largest that I measured was four inches in diameter. The women have the same custom; but I never saw one with so large a ring as the men wear. It is usually worn by the young unmarried of either sex; the elder married folk are only occasionally seen with it. The septum of the nose of the elder men is often bored, but the fashion of wearing an ornament in it has apparently died, as we never saw a nose ornament inserted in any case.—*B. T. Somerville in Jour. Anthrop. Institute, Great Britain and Ireland, May, 1897, p. 362.*

THE LAST OF THE YUKIAHS.—In an article in the *Scientific American* for July 3, Enos Brown writes: "There still lives a remnant of this once numerous tribe at Hopland, Sonoma county, California. Only two or three hundred are left. There has been secured to them a tract of worthless land, upon which they have settled and where they make a feeble pretense of raising vegetables and fruit. They own a little stock and are called civilized. These people have some virtues—hospitality, for instance. The women make baskets which are sometimes artistic, being ornamented with different colored straw, woven in angular figures, and with feathers from gaily-colored birds. The federal government is doing all in its power to protect them from their most dangerous enemy, rum, but with indifferent success. To this cause and to diseases incident to civilization the decimation of this remnant of the old Gallinomeros or Yukiah Indians may be ascribed. Every year shows their number decreased, and a generation hence will find the last of the tribe awaiting his final call."

THE BEGINNING OF ZOOCULTURE[1]

W J MCGEE

THE DESERT ENVIRONMENT

In arid regions the distribution of flora, fauna, and human population is determined primarily by the distribution of water.

In the deserts of southwestern United States and northwestern Mexico the locations of plants, animals, and men are controlled by delicately adjusted conditions of climate, topography, and rock-structure. Since the meager rainfall is far too slight to support a vegetal mantle, the ordinary leaf-bearing trees and shrubs are confined to certain valleys in which the waters are concentrated either by the conformation of the bounding hills or by subsurface structure, or by both of these conditions in combination; the animals depending on this flora for subsistence are confined, albeit somewhat less closely, to the same valleys, and the human hunters, graziers, and farmers are clustered about these oases, leaving vast expanses of vacant land between. During recent centuries and to a considerable extent during olden times this sparsely distributed population has been agricultural and pastoral, limited in number, and (in comparison at least with the most advanced peoples) decidedly provincial in character. The conditions favor patriarchal or feudal organization and oppose extensive confederation or national union; and throughout northern Mexico, conformably to these conditions, the smaller settlements gathered about a single spring or well are usually patriarchal even today, while the larger villages have strong feudal characteristics, and have been welded slowly and incompletely into republican confederation only through persistent and intelligent effort by one of the world's greatest leaders during the last quarter century.

In Papagueria—the land of the nomad Papago Indians in Arizona and Sonora, the most arid area of equal extent in North America—the distribution of ordinary plants, animals, and men is most rigorously fixed by the scant water supply, as is the case in other deserts, and at the same time certain essential features of the organisms are shaped by the bitter struggle for existence against the common enemies of sun and sand. Thus a distinctive flora has been developed, including pulpy cacti and agaves and other plants whose special structures fit them to extend far beyond the water-places. As already set forth,[1] this flora is notable for leaflessness and thorniness, as well as for the development of chlorophyll within and glazed or pilose armor without, while the animals are notable for protective coloring and conformation, as well as for fleetness in some and venom in others; yet, despite this strongly-marked individuality, the animals and plants are interdependent to the extent that the life is gathered into colonies in which even the alien and the inimical are mutually dependent—in which all living things from the lowliest shrub to the economical cactus, provident ant, and intelligent man are combined in a solidarity so perfect that each exists for the benefit of all the others. The essential quality of desert life, combining as it does notable individuality and even more conspicuous communality, is not easy to express; it may be called vigor, strength of character, or perhaps still better *prepotency*, using Huxley's happy term in its more general sense. The reason for the quality is evident, and has been recognized by different students of desert life: Only the individually vigorous organisms are able to survive the hard conditions and leave increasingly vigorous progeny to maintain themselves against the slow desiccation of the aging continent; only those organisms can survive and leave progeny that are able to coöperate in the common strife against the hard physical environment; and, in the eons of struggle, the initial potency common to living things has been developed into a prepotency whereby the vitality of the desert is raised to a distinctive plane, none the less real because it grades down to the mean, much as desert climate merges with normal climate about the margins of the arid region.

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[1] Presented before Section H of the American Association for the Advancement of Science August 26, 1896; read (after revision) before the Philosophical Society of Washington May 29, 1897, under the title "Some Relations between Man and Lower Animals."

These features of the life of the desert must be borne in mind in considering the relations between organisms in arid lands; the distribution of life is controlled by the distribution of water, while the plants and animals are notable for prepotency, which is displayed not only by strong individuality but by constant coöperation.

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[1] "The Beginning of Agriculture," American Anthropologist, vol. VIII, 1895, pp. 350-375.

RELATIONS BETWEEN ANIMALS AND MEN

The Vulture.—About every patriarchal rancheria, whether Mexican or Indian, located by spring, well, or storm-filled tanque, there is a flock of vultures. They are the village scavengers; they swagger clumsily about corrals and houses on foot, sometimes approaching within a few yards of adults belonging to the rancheria and even closer to small children and girls, though they commonly avoid half-grown boys; if molested, they retreat awkwardly with half spread wings, or take to swift and graceful flight. Anon they perch on fences hard by the houses, or roost on more distant trees; if food runs low, a part or all of the flock circle upward nearly to the limit of vision and soar away over plains and mountains in search of random carrion or a more wasteful or unfortunate rancheria; but they appear to return duly to their own locality.

Approaching a typical rancheria in western Sonora, one of my party wantonly shot at a vulture perched on a corral stake. Happily he missed, and the creature took wing, but the score of rustics were thrown into commotion. Inquiry showed that this was due to the fact that it was *their* vulture that so narrowly escaped; not the vulture of El Patron, La Señora, or any other resident, but one of the flock of vultures belonging collectively to the group of people. Further inquiry elicited the information that the ownership was shadowy, much less definite than that of the dog which commonly attaches himself to some individual or subgroup, less definite than that of the saddle-horse claimed by his habitual rider, less definite even than that of the indiscriminate member of the herd which, with the others, belongs to El Patron; they are seldom recognized individually any more than the inconspicuous steer or burro of the herd, though sometimes a specially large or otherwise distinctive vulture receives a half-jocular sobriquet by which he is known to the youth and many of the adults. It was ascertained, too, that the people are well acquainted with the ordinary affairs of the birds (though not with the places and habits of breeding), and that their sentiments are tolerant and friendly, ripening into vague guardianship and thereby into indefinite collective ownership; the creatures are not regarded as especially useful or valuable, but are considered harmless and companionable, and a fitting mark of the importance and respectability of the family rancheria. On their part, the birds are thoroughly familiar with all outdoor affairs of the human folk; they note the comings and goings of wanton boys and heartless herdsmen and time their visits to house and corral accordingly; at the first preparations for the slaughter of a beef they are on the alert, but patiently await their portion; they have an eye to the herds and undoubtedly anticipate (and in rare cases hasten) the death of the weakling; and even when the bulls battle at the waterside they watch the contest hungrily and sluggishly exult over a fatal termination, or depart with a ludicrous air of disgust if one of the contestants turns tail. Their attitude toward the people of their group is respectful and moderately fearful—little more fearful than that of ordinary domestic poultry; but they are more distrustful of strangers, as they are of all persons remote from the rancheria.

The Dove.—Throughout western Sonora small doves are common in the vicinity of settlements, though seldom seen over the expanses between. Sometimes they are captured and caged, and are favorite pets of maidens and young matrons, each of whom commonly possesses one and sometimes two or three. They seldom if ever breed in confinement; most are taken young by children, though fully grown specimens are sometimes snared or trapped. They are less familiar with their patron people than the vultures, but frequently adjust their movements to those of their human associates, especially in their visits to well or tanque for drink; they glean the fields and haunt the granaries at the harvest, but retreat othertime to the chaparral, where they nest and rear their young; yet when hawk or eagle swoops, they often retreat toward the human domicil and even take refuge beneath its roof. Both Indians and Mexicans regard the doves with friendly tolerance, and welcome them to field, corral, and plaza; the youth defend them against the attacks of predatory birds and seek to relieve their terror with soft words and proffered food; but, in time of need or when they are so abundant as to injure crops, they are trapped or otherwise taken, though rarely shot, for their flesh. They are less suspicious but more timid than the vultures, and tolerate the human presence with a somewhat capricious familiarity.

The Quail.—The graceful and active California quail abounds in Papagueria, and, through the demand for food and drink, his kind most abound in the vicinity of water-places where human settlements are congregated. About harvest-time they collect in the fields, and at other seasons gather stray morsels from the remoter corrals, invading the plazas only in the absence or invisibility of human occupants or in case of storm or famine. They are regarded as rather ignoble game; among the Indians they are taken usually by boys with arrow, stone, or snare, while even among the pistol-wearing or rifle-bearing Mexicans they are seldom shot. Their attitude toward their human associates reflects their treatment; they are shy up to bow-shot distance, contemptuously bold beyond; they are thoroughly familiar with the human figure, moderately familiar with human movements; they profit by the planting of fields and the storing or pumping of water, for which they pay an impost in flesh; but the relation between bird and man is an antagonistic coöperation compelled by environment, yet one through which both are benefited.

The Coyote.—At the Indian village of Poso Verde the party was made up of leader and Papago interpreter. The male villagers and some of their spouses were recently returned from the fiesta of Santa Magdalena, 100 miles away, laden (inside and out) with mescal; and all the men, save the old shaman, and most of the women were uproariously drunk, so that night as well as day was hideous. Perhaps for this reason the interpreter left the camp hard by the village during the first two nights, sleeping in an outlying ki (grass house) beyond the reach of disturbance, and several times the solitary sleeper was awakened by coyotes sniffing about the meager larder and even about the blankets, only to flee swiftly and noiselessly with the least movement, so that only once was the retreat hastened by an unsuccessful shot. When this incident was recounted to the interpreter, he intimated that it was not good to shoot coyotes; and a subsequent conversation with him and the aged shaman elicited the information that the Indians at this place did not like to injure coyotes, and expected them to visit plazas, corrals, and fireplaces during the night and gather up neglected or discarded food refuse. More extended inquiry here and inquiry and observation elsewhere among the Papago villages showed that this sentiment toward the coyote is common. He is regarded as a mystical or somewhat supernatural coadjutor of man; his twilight howling on the neighboring hillside is carefully noted and interpreted as information concerning the presence or absence of strangers, the situation of the stock, the state of coming weather, even the sentiments of the mysteriously potent deities dwelling in the adjacent mountains; and if he did not pay his customary nocturnal visits they would suspect proximity of the hated Apache or other enemy, or fear the wrath of some more shadowy demon. In one of the strongest clans, which has representatives in most of the Papago villages, the coyote is the incarnation of the tutelar beast-god and is especially sacred—so sacred that killing him would be not merely a crime but the most heinous sacrilege; and to some extent this veneration is shared by the members of other clans. So the coyote is tolerated, sometimes with reverence and affection, sometimes with apparent indifference, which is always rather friendly than otherwise; the men and women and even the infants are familiar with his appearance, anticipate his visits, and listen interestedly to his resonant mouthing; and they are accustomed to the occasional admixture of his blood with that of their own dogs of European lineage. The coyote, on his part, is thoroughly familiar with the characteristics and habits of the Indian villagers, even with their household arrangements, and adjusts himself to the conditions with foxy cunning; he wanders far over the waterless stretches in search of game, and breeds in seclusion, but his favorite haunts are near the Indian rancherias, where he finds some food, more water, and a tacit encouragement to prowl. The actual benefits of the association to the coyote are considerable, especially where the water-supply comes only from deep wells; the advantages to the man are mainly imaginary, yet in some part real, since the animal is a watchful sentinel, and even his trails and scattered tracks and his excavations in the sand for water are full of actual meaning to the wanderer trained in desert lore.

The Seri Indians living over against the Papago on the shores and islands of the Gulf are much less affected by civilization; they have no domestic animals but dogs, and these apparently of fully half coyote blood on the average, some showing hardly a trace of consanguinity with the European stock. They, too, are friendly with the animal—the tutelar deity of one of their clans—who runs about their rancherias unmolested, coming almost within kicking distance, and paying no attention to movements which would scatter non-tolerant animals in terror. Other tribes in various parts of the country were equally familiar and friendly with the small wolf, and some, like those of the Siouan stock, had domesticated him as a beast of burden and draft and a source of food in emergency as well as in ceremony.

The Cow.—Throughout much of Papagueria the people are pastoral, and their largest herds are of kine. These are of course domesticated, the descendants of European stock; yet their condition is by no means that of the thoroughly domesticated cow of the dairy farm or cottage, not even that of the animals on the ordinary stock ranch of the western states; they are wild and vicious, fearful of men, especially strangers, absolutely uncontrolled in respect to breeding, and, except for the annual rodeo, often nearly as free from human constraint as the bura deer of the mountain-sides. They are held in contact with man chiefly by the need for water, preferably taken from tinaja or barranca far from human habitation, but from well or tanque during the drier months. The well may be remote from habitation, save perhaps an adobe house in which two or three vaqueros exist to draw the water (in a rawhide bag by means of a riata laid over a beam and snubbed to the saddle-horn); the tanque may be a dozen or a score of miles from the nearest rancheria. Hither the cattle repair daily or bi-daily, about sunset, in herds of a score or possibly a hundred, each led by a powerful bull continuously bellowing defiance as he approaches; at the waterside the herds meet, sometimes to mingle peacefully or with minor battles among the subalterns, but often to witness fierce conflicts between the respective leaders, which are often duels to the death. After drinking, the beasts wander away, browsing as they go, toward their respective ranges, whose limits are fixed by frequent fighting; they travel 10, 15, even 20 miles, and their tracks, which may be composed into radii from the tanque as a center, are a guide to the observant traveler. On the more remote ranges the stock flee or hide among the mesquites like deer from the horseman, but would promptly attack a footman; at the water-place they are more tolerant of the individual vaqueros with whom they are acquainted, though quick to either attack or flee from strangers. Only on the most civilized ranchos are the cows milked; here a few of them are trained to this use, perhaps for weeks or months, by three or four vaqueros who, amid clouds of dust and expletives, cast their riatas over horns and feet, snub them taut about their saddle-horns, and have their horses hold the struggling beast or throw it in case of too violent resistance. The calves dropped on the range are even more fearful of men than the adults, and, so long as they suckle, avoid the water-places; commonly their first real acquaintance with the master is at the rodeo, where the deft riata and red-hot branding iron serve only to deepen their fear and hate of the human presence. On the whole, the kine are sullenly tolerant of mankind through the constraint of thirst and the restraint of defeat in conflict; while the men tolerate and constantly strive to subjugate the unwilling animals only for the sake of food, clothing, and saddlery. The toleration is the unkindest of the desert, and is maintained only because of its mutual beneficence—without the kine the rancheros would be impoverished, and without the artificial wells and tanques most of the cattle would famish.

Certain noteworthy characteristics of the cattle and men grow out of the customs of the desert country. The patriarchal bulls are self-chosen leaders, who defend range and harem by dint of battle; and natural selection—there is practically no artificial selection in Papagueria—tends to produce a strain of powerful, active, and sharp-horned stock, capable of defending themselves against carnivorous enemies. At the same time the vigorous and vicious cattle must be controlled by the vaqueros; and it is the highest ambition of these modern knights to subjugate the animals without slaughtering them, *i. e.*, by means of their own courage and alertness, in conjunction with the speed and strength of their horses; so natural selection—for on this plane the methods stand—produces a strain of bull-fighters. The strife between bulls and men is not without benefit to both, for in both the antagonistic coöperation has resulted in the development of strong character, or prepotency, like unto that of the plants and all the other animals of the desert. Among the vaqueros the habitual labor is mimicked in sport, and leads to competitive contests and eventually to the development of professional toreadors and to elaborate bull-fighting arenas in the larger villages and towns. Thus professional bull-fighting is merely an adjunct and outgrowth of peculiar conditions; wheresoever men are supported by herds of half-wild cattle, and are inspired by emulation and the hope of sweethearts' smiles, there bull-fighting must arise, and moralists but waste their breath who declaim against it; yet it could be eradicated in a century by judicious admixture of gentle Jersey or other cultured bovine blood, or by polling the herds—for just so delicate is the adjustment between man and beasts in pastoral culture.

Summary Relations.—There are relations between men and other animals in the deserts of Papagueria, but those of the vulture, the dove, the quail, the coyote, and the cow are representative. In each case there is an intimate association which is commonly more or less antagonistic, yet mutually beneficial. The vulture is a scavenger, the dove is a pet and the quail a gleaner while both are food-sources, the coyote is a tutelar guardian and scavenger, and the cow is a source of wealth. Associations of the sort are not, indeed, confined to Papagueria; visitors to the ancient city of Charleston are familiar with the buzzards roosting on the market-house, petted by the people and protected by ordinance in recompense for their services as public scavengers; on many eastern farmsteads the common quail is a family protégé and wanders at will about fields and granaries; in some cities, like the Moslem capital on the Bosporus, ownerless dogs take the place of Charleston's vultures, and are guarded by popular sentiment and public law, as in the days of Willis' "Pencilings by the Way," when the citizen who slaughtered one of the vicious curs of Constantinople was fined in a quantity of wheat sufficient to bury the beast when suspended by the hind feet with nose touching the ground; yet it is noteworthy that the relations are closer and more numerous in the deserts, where the antagonistic elements of environment are few and fierce, than beneath softer skies. It is significant, too, that in all of these cases the relations are alike in one respect—they are *essentially collective*, not only on the part of the men, but on the part of the animals; the primary relation is not between individual man and individual animal as in perfect ownership, nor between a single individual of the one and a group of the other as in ordinary domestication, but between a group of the one and a group of the other.

SIGNIFICANCE OF THE RELATIONS

On considering the several cases of relation between animals and men, they are found to present certain similarities; yet there are differences. The relations of mankind with quail and coyote are wholly collective, and there is no definite ownership (save in the rare cases in which individual animals are restrained); in the case of the vulture the relation is also wholly collective and the ownership shadowy; in the case of the dove the relation is collective and not at all proprietary, save in the pets; while in the case of the cow the relation is collective only in a general way, which is qualified by ownership of the entire herd by the patriarch—yet even this ownership is much less definite than in civilization, *e. g.*, in that it is understood that any hungry traveler is entitled to kill such stock as he may need for his own consumption. Although the cow alone is classed as domestic and was imported into the country for man's behoof, the other animals are hardly less dependent on man for continued existence. If a migration of the nomadic type were made by Mexicans, or more especially by the Papago Indians, the herd would be driven slowly, consuming such pasture as might be found on the way; undoubtedly the vultures and coyotes would follow the clan and herd; a part of the doves would be carried in cages, some others would follow, and those that stupidly remained behind would doubtless die, while the short-sighted quails would probably remain to suffer decreased food-supply and increased predation.

On considering the several aspects of the relation between animals and men, it is found easy to arrange the series in the order of intimacy. In the Mexican villages the order is undoubtedly, first, kine; second, vultures; third, coyotes; fourth, doves, and, finally, quails—*i. e.*, the relation runs down from domestication to simple association enforced by the hard environment. Among the Indians the order appears to be, first, kine, acquired from the Spaniards; second, coyotes; third, vultures, and, fourth, doves, for, so far as observed, the quail and Indian can hardly be said to be coöperative. Now it is to be remembered that the relations exemplified in these cases are veritable and—save perhaps in the case of Indian and quail—represent mutual adjustment on the part of both the associates; the habits of each copartner would be modified by the removal of the other; and the several associates, with others, combine to form a similarly interdependent assemblage, or a solidarity.

On considering the degree of relation it is found that the clearest line of demarcation is between that of the kine and those of the lowlier animals, and, partly in deference to common usage, the cases may be classified with respect to this line. Under such classification the kine alone represent domestication; the others are essentially alike in that they are characterized by mutual *toleration* between men and the respective animals without definite ownership or purposive control on the part of the former.[1] There is a third class of relations between men and animals, which it is not the purpose here to discuss, represented by previsional breeding, or stirpiculture, or *artificialization.* So the effective relations between animals and men, in which the former always yield eventually to the dominant intellect of the latter, may be called *zooculture,* and may be seriated in three great classes, which also represent stages in development, as follows:

$$\text{Zooculture}\left\{\begin{array}{l}\text{Artificialization}\\ \text{Domestication}\\ \text{Toleration}\end{array}\right.$$

THE GENESIS OF ZOOCULTURE

One who observes the several cases of mutual toleration between animals and men in Papagueria can hardly fail to inquire why simple toleration has not passed into complete domestication. The inquiry is not altogether fruitless. It is found that vultures are on such terms of intimacy with the residents of the rancherias that they might, with little effort, be coaxed into the domicils, and in the course of a few years trained to return to them like domestic poultry; this is not done, as is evident, and indeed as the rancheros explain, only because they are unclean and foul-smelling birds, attractive enough at a little distance, but repulsive on nearer approach. Among the Indian villages it is found that the coyote is repelled from the firesides and plazas only by the fully domesticated dogs of European descent; and, as the shaman at Poso Verde explained, the coyote is too independent in spirit (*i. e.*, too fractious and petulant in disposition) to associate or compete with the common dog about the household; yet the Indians have traditions of a golden past in which coyotes and men associated freely, and, in view of the domestication of the animal among scores or hundreds of tribes, it is manifest that the tradition contains a grain of truth. Among both Mexicans and Indians it is found that the dove is so familiar with the human folk as to suggest that it might be completely domiciliated, as it is in small part—indeed, when one of an adult pair is caged the mate voluntarily takes up its abode on or alongside the cage, which it leaves only for food or water, or on too close approach of the somewhat-feared human associate; and, so far as can be judged, complete domestication is neglected only because the bird is too small to be valuable as poultry, and too easily taken to demand culture in confinement. It is found, too, that the more wary quail is regarded as too small and trifling for serious attention. So adequate reasons appear for the retention of the several animals in the lower stage of zooculture.

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[1] The term *toleration* has recently been used in about this sense, though in a less definite and not a denotive way, by Giddings ("Principles of Sociology," 1896, pp. 113, 114). He justly says: "As soon as toleration is established coöperation and alliance are possible. Mutual aid begins unconsciously in accidental helpfulness and protection. Natural selection preserves it, and at length, when its benefits are perceived, it is consciously perpetuated."

When the inquiry is pushed into the past and extended to other animals it is still found fruitful. Evidently the present reasons for failing to domesticate the coyote did not apply before the importation of the European dog, and it is accordingly easy to understand how he was brought into domestication through the antecedent stage of collective toleration; the conditions being especially favorable when the habitat of the coyote was shared by the wolf which drove the smaller animal to human shelter, where his presence gave notice of the more dangerous enemy, so that the human and bestial copartners were both benefited. It is evident, too, that the present reasons did not apply to the peaceful and toothsome turkey, which must have sought refuge about the prehistoric rancherias just as the dove does now; so it is easy to see how this animal became domesticated so completely as to be guarded by night in corrals and covered shelters by the ancients of both Sonora and Arizona. It is equally evident that the reasons did not apply to the timid guanaco or vicuña, whose useful pilage, edible flesh, and capacity for burden-bearing must have attracted the cupidity as well as the sympathy of the ancient Mexicans, and led to that domestication which is recorded in prehistoric corrals as well as in petroglyphs and paintings. The modern association is essentially collective, and owes its intimacy to the mutual acquaintance of the animals and men and to the toleration by each of the presence and movements of the other; and the occasional capture and confinement of individuals is a relatively unimportant factor. The character of the prehistoric association is lost in the mists of antiquity, yet it may safely be inferred from that of the present, and the only reasonable inference is that the course of natural development has been uniform, and that the prehistoric association was also collective and arose in mutual toleration; and this inference is checked and verified by the fact that it was those species (and those alone) best adapted to mutual toleration with agricultural man that were brought into domestication on the western hemisphere before the advent of the Caucasian.

THE INFLUENCE OF ENVIRONMENT ON ZOOCULTURE

Observation in all lands shows that plants, animals, and men are dependent on their physical environment in varying degrees. The stationary plant lives at the mercy of sun and storm, moisture and soil; the moving animal seeks shelter from cold, heat, and wind, journeys to water, and migrates in search of food; thinking man builds habitations and manufactures clothing for protection against the elements, and stores, manufactures, and transports food and drink. So the living things of the earth may be arranged in an order of emancipation from physical conditions, and this arrangement is found to represent also the order of self-activity or spontaneity—the plant adjusts itself to conditions, the animal seeks or flies conditions, the man modifies conditions.

All observation shows, too, that plants, animals, and men are dependent on their vital environment in varying degrees. The mindless plant assimilates sluggishly the mineral and vegetal nutriment brought to it by physical and vital chance, consuming a little more greedily the more highly differentiated organic substances, and thus adjusting itself mechanically to general vital conditions; the instinctful animal seeks the higher and more readily assimilable organic substances, selecting the good and rejecting the bad, consuming plants and sometimes other animals and thereby interacting with both, and thus by unconscious or subconscious effort adjusts itself to the living world; thoughtful man begins on the plane of the animal but soon learns to cultivate the good and eliminate the bad among animals and plants, and thus makes conquest of the vital environment just as he modifies physical conditions. So the living things of the earth may be arranged in order of potency or of grade of faculty, when this arrangement is found to represent also the order of intellectual development or mentality—the plant is purposeless, the animal unconscious of purpose, the man purposeful. This arrangement serves to contrast vitality and mentality; the course of vitality is shaped by conditions, but it is the province of mentality to mold conditions.

Observation shows, in like manner, that plants, animals, and men are mutually helpful in varying degrees: The apathetic plant, in so far as constrained by the cruel law of the survival of the fittest, strives against its alien fellows and even its own kind for stature, length of life, and abundance of seed; its strength is against its neighbor, and it combines slowly and imperfectly with other organisms of its own grade, preferably of its own species; yet it is ready to profit selfishly by the labors of pollen-bearing bee, seed-distributing bird, or cultivating man. The sentient animal enters, partly by planetary chance and partly through instinct, into combination with its fellows and also with the plants and other animals on which it subsists; if it selfishly destroys the living things forming its own food-supply it pays capital penalty, while if it improves the creatures constituting its provender it reaps due reward; and the species that most effectively contribute toward the improvement and perpetuation of food-yielding organisms survive longest and flourish most exuberantly. Inventive man, realizing at once what the beast learns only through the extinction of numberless species, preserves the stock and next the seed of useful plants, and then learns to sow, harvest, and garner; at the same time he warms toward tolerant animals, and in time protects them from enemies and succors their young; but he wages war on intolerant animals and useless plants, and gradually exterminates their species; and in these and other ways he exalts his own kind, aids the good among plants and fosters the good among animals, and multiplies both vitality and mentality. So the living things of the earth may be arranged in an order of helpfulness to contemporary organisms, and this arrangement will be found to represent also the order of domination—the plant mechanically antagonizes contemporaries, the animal instinctively encourages certain contemporaries and discourages others, the man recreates and harmonizes the good and destroys the evil among contemporaries. The arrangement serves to contrast egoism and altruism; the selfishness and cruelty of the living world culminate in the lower stages of vitality, while beneficent altruism, at first the offspring of intellect, gradually rises to crown and dominate the parent.

The various observations show that the progress of life on the earth is from relative inaction to external and internal activity, from mindlessness to instinct and intellect, from barren egoism to coöperation and altruistic motive. Various stages in this comforting and promising course of development are represented by different groups of plants, animals, and men, whether considered severally or collectively; and in all cases the stages are found to reflect physical conditions with considerable fidelity. The cases are too many and too infinitely varied for enumeration; but it may be noted that vitality and mentality are of a higher order on land than in the sea, in the temperate zones than in the tropics, in arid regions than in humid lands; or, in general terms, that the excellence of life culminates where the physical conditions are such as to demand exercise of faculty, whether in the form of self-activity, mentality, or beneficent domination. The general course of life on the earth is in harmony with the portion of the course represented in Papagueria and other deserts where the plants and animals are characterized by a vigorous prepotency—where the genetic tree of organic relation is so successfully forced that the plants display the germ of instinct, the animals the germ of reason, while both are forced into the earlier stages of altruistic organization through the stress of strife against a common enemy; and here it is that the dominant intelligence of man is specially fitted to enter into and control the incipient organization of his subhuman contemporaries. So, while it may not be denied that the stage in collective cooperation among living things represented by the beginning of zooculture might originate in humid areas, it must be considered infinitely more probable that the stage was reached first in the arid lands of the continents.

The lessons of the relations between animals and men in Papagueria are simple and easily read; the first lesson is that the relations are collective; the second lesson is that there is a stage of mutual toleration of presence and movements anterior to domestication proper; the third lesson is that the relations are forced in rate of growth and in intimacy by a rigorous environment.

It has already been shown that agriculture was, in its beginning, an art of the desert; it may now be affirmed that the sister art, zooculture, is also a child of sun and sand.

BOOK REVIEWS

The Ghost-dance Religion. By James Mooney. Extract from the Fourteenth Annual Report of the Bureau of Ethnology. Washington: Government Printing Office, 1896. Pp. 640–1136. 8°.

The greatest aboriginal revival that this country has ever seen was the recent one known as the Ghost-dance Religion. It was greatest not only in the area over which it spread and the number of the tribes which it involved, but also in the hold which it took on the different peoples who subscribed to it and who practiced its simple ceremonial. That it should have taken such a hold on them was only natural, since this religion offered to the savage the promise of a return to those primitive conditions which had been a part of the earlier life of men as yet not middle-aged. Chief among these promises was the assurance that the buffalo should return, and this meant to the Indians plenty and comfort. No blessing ever seemed to any people so bright in retrospect as do the vanished herds of the buffalo still appear to those Indians who can recollect the happy days of buffalo plenty, in which they themselves had part.

The history of the ghost-dance religion has just been written. Until the publication of Mr Mooney's volume, knowledge of this revival was confined to a mass of scattered individual observations and conclusions, and a still greater mass of crude, unintelligent, and misleading newspaper articles, in which truth and falsehood were inextricably confused. Now, however, we have history, and history written by a trained field ethnologist, whose knowledge of Indian character has come to him in the only way in which such knowledge can be acquired—by living with Indians. Mr Mooney has visited most of the tribes which took part in the ghost dance, and the extent to which he has won their confidence is shown by the fact that he himself has stood in the slowly revolving circle and chanted the plaintive and thrilling songs that with mysterious cadence rose and fell over the moonlit flats, as the deeper voices of men and the shriller tones of women blended in their prayer to the Father. No man has ever listened to these songs, rising from hundreds of throats, without being stirred by them and impressed by the earnestness of the worshipers.

The ghost-dance religion was the expression of a hope which is common to all humanity and which is strongest among peoples in the child state of culture, when confidence is greatest and faith in the possibility of a return of a golden age still exists. This hope was cherished by the Indian long before the coming of the white man, and on it were based the revolt of the Pueblo Indians, which drove out the Spaniards from New Mexico, the Peruvian revolt of the eighteenth century, the teachings of the Delaware prophet and Pontiac, of Tenskwatawa the Shawano prophet, of Tecumtha, and of other later prophets, several of whom preached in our own time. One of these was Smohalla, whose doctrines were widely accepted among the tribes of the Upper Columbia region; another was Tävibo, the father of Wovóki, the Messiah of the ghost-dance religion.

All these prophets preached a doctrine inculcating purity of life and the putting away of the things which had been received from the white man, and it was promised that if their instructions were followed a new era would come, when the old condition of things should be restored.

The doctrine of the ghost dance is that of a general resurrection of all Indians who have died and an eternal life under primitive aboriginal conditions—for the dead and the living Indians alike—on a new and regenerated earth. Starting from this foundation, the doctrine spread, being changed, added to, and modified as it passed from tribe to tribe, and as those individuals who fell into the trances reported their visions from the land of the spirits. Resistance to the whites was never a part of this doctrine. It was essentially one of peace and good will. The date set for the mighty change was usually one not far off. The songs and the dances, which constituted almost the whole ceremonial and which were to hasten the coming of the change, were merely the Indian method of praying.

Mr Mooney devotes but little space to the ghost dance in the region where it started—that is, west of the Rocky mountains—for there it never attracted great public attention, but he gives a very full account of it on the plains and among the Sioux, the only place where it led indirectly to bloodshed. The detailed story of the massacre at Wounded Knee by United States soldiers of nearly 200 fleeing women, children, and sucking babes is told clearly, simply, and effectively. That and the butchery of Few Tails and his family by white settlers would do well, with a few changes of names, for two accounts of the slaughter of simple and harmless Armenians by bloodthirsty Turks. To the student of human nature it is interesting to see how unsparingly we condemn the brutalities of other nations and how entirely we overlook those which we ourselves commit. Histories of our Indian wars are full of harrowing accounts of the slaughter of women and children by Indians, but only vague mention is made of our own wholesale butcheries like those of the Cheyennes and Arapahos at Sand Creek, the Piegans on the Marias, and the Sioux at Wounded Knee. The bravery, coolness, and moderation of the Indian police who defended the agency against the attacks of their own people is very striking.

The ceremony of the ghost dance is fully treated. The song rehearsal, preparations for the dance, painting, ceremony, the Crow dance, the hypnotic process by which dancers were thrown into the trance, and the area and present (1894) condition of the dance are fully described in general terms. In addition to the designs used in painting noted by the author, it may be said that the northern Cheyennes paint two or three slender zigzag lines running down the cheeks from the inner corner of the eye, which represent tears trickling down the face, expressive of sorrow, though whether it is sorrow for sin or for their relations who have died or for the delay in the Messiah's coming is uncertain.

Following the general account of the dance are given a number of examples of similar revivals, ancient and modern, which have taken place among the white people and which in many respects parallel the one under discussion. A study of these outbreaks of religious fervor is of great interest.

The last half of the volume is devoted to a more particular account of the ceremonial of the religion as practiced among different tribes. The first considered is the Arapaho. Its tribal synonomy is given, its tribal signs, and a general sketch of the tribe. Then follow 73 songs, each given first in Arapaho, and then in free English translation, and last of all a glossary of the

Arapaho words used in the account. In the same way the Cheyennes are treated with 19 songs, the Comanche with 4, the Paiute, Washo, and Pit River Indians with 9, the Sioux with 26, the Kiowa with 15, and the Caddo and associated tribes (Wichita, Kichai, and Delaware) with 15. A list of the authorities cited closes the volume.

To the ethnologist that portion of the volume which treats specifically of the different tribes is perhaps the most interesting, but to the student of humanity every page of the whole work is suggestive. We are impressed not only by the evidences of patient study devoted to the dance itself—the field work—but also by the care and research given to collateral subjects which have a bearing on and tend to illuminate the theme of the book. Not only is there throughout the volume every evidence of careful scientific thought and work, but the subject is presented with a good degree of literary effectiveness.

In one of the Cheyenne songs appears a translation of a proper name—that of the supreme power or principal god—which, though literally correct, is not altogether satisfactory. *Hĭ ama wĭhu* is here translated White Man Above, a meaning which is always given it by the interpreters. We believe the actual meaning to be quite different. The point turns on the signification of the word *wihu*, for *hē ám* is an adverb signifying above or on high. *Wĭhu* or *wĭhyo* is the Cheyenne word for white man and also for spider. The root of this word, however, conveys the idea of mental power of high order—superhuman or super-Indian ability—the power to conceive and also to carry out, and it contains also a suggestion of beneficence. The same root is seen in the word for chief. If this is true, it would seem that *wĭhyo* has nearly or quite the same significance as the Arapaho word *Niátha* = the wise one, which is that people's name for white man, and which also signifies spider. *Hĭ ama wĭhu*, then, would signify ability from above or great intelligence on high.

Mr Mooney's volume is profusely illustrated by 37 full page plates and maps, some of them colored, and by about 50 figures in the text.

Geo. Bird Grinnell.

Totem Tales—Indian Stories Indian Told. Gathered in the Pacific Northwest by W. S. Phillips. Chicago: Star Publishing Co. 1896.

This collection of native tales from the northwest coast, a region but little known to the general reader of Indian life, custom, and belief, gives in a condensed form much of the material familiar to folklorists as given in a more extended and scientific manner by Boaz, Eells, and others, who have lived or visited in this region for the purpose of investigating these tribes. Not that the work of this author is not original, for it surely is, and well done at that, but the stories are either fragments of long tales or else an outline of such, for the average story-teller among the Indians knows but little else, and the full tales, taking often hours and even days to recite, are only to be had from the shaman.

The book makes a genuine contribution to our knowledge of these people, and the unique manner of telling reminds one of "Uncle Remus" and his animal tales, as the writer quaintly pictures "The Talking Pine" near the edge of the "Lake of the Mountains" swaying in the breeze, whispering the tales to T'solo the Wanderer.

Like most stories of the kind, it deals with the primitive conception of nature and nature manifestations. The author truly says, "The general idea of the white people seems to be that Indians believe in one supreme being or 'Great Spirit,' which corresponds to the God of our Bible. This is not the case at all, for their religion is a mixture of Tah-mah-na-wis, or magic; Skal-lal-a-toots, or fairies, and Too-much, or devils, the evil spirits, coupled with a vast legendary lore of a purely mythical nature—fairy stories, in fact—of which 'Totem Tales' constitute a part."

The vocabulary and historical appendix contain much valuable information. J. H. McCormick.

Old English Customs Extant at the Present Time, being An Account of Local Observances, Festival Customs, and Ancient Ceremonies yet Surviving in Great Britain. By P. H. Ditchfield, M. A., F. S. A. London, 1896: George Redway, Publisher.

The object of this work, as the author well says in his preface, "is to describe all the old customs which still linger on in the obscure nooks and corners of our native land (*i. e.*, England), or which have survived the march of progress in our busy city's life."

Many have been the books upon the folk-customs of bygone days, but the collection of those that exist in our very midst and in our own times seems to have escaped the attention, in a great measure, of the lover of the quaint and curious, or else have been passed over as of too little value upon which to spend our time; but in so doing we are recording facts that would otherwise be lost to posterity, for we recognize what our ancestors failed to do in this direction.

Taking up the customs in chronologic order as they occur in the feasts and festivals of the church, he traces them in variant form in each county or shire with painstaking care, giving the ancient origin where known, or the supposed origin when it is conjectural.

He attributes the decay and disappearance of many of these quaint usages to the agricultural depression, the invasion of railroads and other means of rapid transit, and to the different avenues of amusement afforded at the present day, all of which were lacking forty or fifty years ago and necessitated home amusement. He shows many of them to be derived from the old Norse and Druidical rites, as well as the early teachings of the Roman church. Mummers, Morris-dancers, masqueraders, and others, grotesquely costumed, frequented the streets upon many of these occasions and with song and dance begged of the people certain gifts appropriate to the season—either money, cakes, buns, or other trifles—in default of which certain punishments are visited upon the person so refusing.

The custom of rice-throwing at weddings is traced to the Chinese, the legend of its origin being a beautiful little story. Marriage, burial, and christening customs are given at some length, and form an interesting feature. The customs resulting from historical events, such as Royal Oak and Guy Fawkes days, are also noted. An appendix gives the Rhymes of the Berkshire Mumming Plays, as well as some of the Morris dances.

Taken as a whole, it is a valuable collection and a much-needed addition to our stock of such information; it is similar in many respects to the little volume, by Mrs Fanny D. Bergen, "Current Superstitions," published by the American Folk-Lore Society, save that it is more extensive and gives the origin of the custom as noted above.

The author quotes freely from the publications of the English Folk-Lore Society, and it is gratifying to note that this is another author added to a rapidly increasing list of writers who are beginning to recognize the value of the work done by these scientific societies and appreciate the publications of such societies. But one thing is lacking to make this volume a valuable work of reference; this is a tabulated list giving either the custom and the counties in which it exists or else the counties with the customs in each. J. H. McCormick.

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THE SCIENCE OF HUMANITY

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Of the Excellence of Humanity

Humanity is a favorite theme of poet and philosopher, novelist and historian, dramatist and moralist. The changes rung on the theme run the entire gamut of human feeling and thinking; its burden is caught in song and story and crystallized in books; and no sweeter strains have ever been sung, no grander scenes enacted, no nobler lines penned, than those fertilized by the touch of human (and solely human) nature that makes the whole world kin.

The chief subject of thought among all races is humanity in some of its numberless aspects; the chief part of the literature of civilized nations relates to humanity; the chief activities of all men are inspired by humanity. Yet—and this is a modern marvel—for the greater part the thought is vague, the literature random, the activity unorganized; *i. e.*, this most important of all subjects-matter and objects-matter in human ken has hardly been brought into the domain of that definite knowledge called Science. It is meet to inquire why this is so; and, to the end that the inquiry may be answered clearly, it is needful first to define humanity and then to consider what knowledge is and the way in which science has come to be; later the half-formed science of that which is proper to intellectual man and most important to his kind may be outlined.

Of the Purport of Humanity

According to the lexicographer, humanity denotes (1) the condition or quality of being human, (2) the character of being humane, (3) the character of being well-bred, (4) mankind collectively, and (5) secular learning or literature.[1] The fourth of these definitions connotes Man—the genus Homo, object-matter of the broad science of anthropology—viewed in a distinct way, *i. e.*, as a mass or composite body rather than discrete individuals. The fifth definition connotes but a limited field in a vast domain, and is scholastic if not archaic; with this sense the term is chiefly used in opposition to divinity, often in the plural form (though there is good precedent for the use of this plural form in a more general and at the same time a more definite sense).[2] The first three definitions connote a wide range of attributes of Man which, albeit well recognized by all intelligent people, are rarely reckoned among the objects-matter of anthropology, seldom included within the pale of science; yet it is these attributes that especially distinguish Man and set him apart from the mineral, vegetal, and animal worlds, and exalt him above the rocks and plants and beasts of simple nature.

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[1] Vice-Presidential address before Section H of the American Association for the Advancement of Science, delivered at Detroit August 9, 1897.

Although commonplace, these definitions are worthy of careful consideration, in that they summarize the substance of intelligent thought since the beginning of writing—indeed, since its own beginning in the remote, unwritten past—and particularly during the era of unprecedented intellectual activity and scientific progress dating from the issue of Bacon's *Novum Organum*; they carry the wisdom of the ages, and especially of these later days, during which wisdom prevails as never before. Viewed separately or in connection with contemporary definitions relating to mankind, they indicate general (albeit vague) recognition of certain specific attributes of Man, not as an animal, but as an ill-defined something known as a Human Being. When the history of thought condensed into the set phrases of the lexicographer is scanned, it is found that bitter controversy has been engendered by the diverse aspects of Man as seen from opposite sides; the disputants, like the storied knights of old, have admired the object, one as silver and the other as gold, and have done doughty battle in defense of their one-sided vision; the biologist, with eyes trained by observation and reason sharpened by long study of living things, sees the silvern side and sounds trumpet for man as an animal, while the littérateur and statesman and philanthropist are half dazzled by the golden glory of Man as a thing supernal. The fair conclusion is that both are right as to what they see and both wrong as to what they fail to see; and in the light of this conclusion it is clear—if the general judgment of the body of thinkers is worth anything—that man has an animal basis on which a noble superstructure is borne. The definitions of the lexicographer, who voices the thought of the world, show that among general thinkers the idea of humanity prevails over the idea of animality, while the current literature of science indicates that the idea of animality is dominant in scientific circles—indeed, some writers on anthropology, the Science of Man, restrict the term to knowledge of the mammalian order Bimana, a limitation excluding the essential characteristics of Man as a thoughtful and emotional being and as an integral part of a collective and interdependent assemblage. Any attempt to harmonize these opposing ideas must begin with definite statement of the meaning attached to the essential term by more catholic anthropologists. So Humanity may be defined, by exclusion, as the condition or quality or character of possessing attributes distinct from those of animals, vegetals, and minerals; or, by inclusion, as (1) attributes or characteristics confined to human beings, comprising (*a*) the condition or quality of being human, *i. e.*, of acting, feeling, and thinking after the manner of human beings, (*b*) the character of being humane, and (*c*) the character of being well-bred; (2) mankind collectively; (3) secular learning and literature.

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[1] Condensed and rearranged from the "Standard" and "Century" dictionaries.

[2] E. g., in "The Humanities," by J. W. Powell; Science, New Series, vol. 1, 1895, pp. 15–18.

The supreme importance of humanity as thus defined is indicated by the fact that it is the foremost subject-matter of thought and speech and literature among all peoples, its prominence increasing from savagery through barbarism and civilization and culminating in enlightenment. The essential distinctness of humanity as thus defined appears when its serial relations to the other primary objects-matter of knowledge are considered: Just as living things rise above the mineral world by the possession of vitality, and just as animals rise above plants by the possession of motility, so do human beings rise above all other things by the possession of specific attributes rooting in mentality and maturing in the complex activities of collective life; or just as inorganic matter is the basis for the essentially distinct organic existence, so organic matter and processes form the basis for the essentially distinct superorganic activities of human existence. The importance and distinctness of humanity are, indeed, such that it behooves naturalists to recognize a fourth realm or world—to extend science from the great realms of the mineral, the vegetal, and the animal into the incomparably broader and richer realm of the purely human; and this extension is the chief end of modern anthropology.

Of the Quality of Knowledge

Human Knowledge is constantly increasing. The body or aggregate of Knowledge is imponderable, and may not be counted or measured or weighed; yet it is an entity of prime importance and of universal recognition. Itself indefinite and varying from mind to mind, the sum of knowledge may be divided, albeit roughly, and analyzed, albeit crudely, and the days and years and centuries of its progress among men and peoples may be so studied that its tendencies and perhaps even the laws of its growth may be followed, albeit slowly and uncertainly. Although so indefinite, it is well worth while to try, and try again and still again, to analyze Knowledge and trace its progress; for Knowledge is the end and aim of intelligence, and human progress is measured not more by increase in knowledge of things than by increase in knowledge of Knowledge.

Many students have found it convenient to divide or classify Knowledge as individual and common, general and special, empiric and scientific, deductive and inductive, etc, according to the point of view; and these divisions are of use in that they represent first steps in analysis—though it is to be remembered that they are more or less vague or arbitrary, one or both. It may not be bootless slightly to extend this provisional analysis in order to trace more clearly the lines and stages in the growth of intellectual product.

For the sake of gaining clear ideas of relation, it is sometimes useful to project perception by the aid of mental imagery, and thereby to visualize the invisible in the eye of the mind. So the great aggregate of Knowledge is often likened unto a numerical sum, or a reservoir or river fed by many affluents; but a better figure may be found in scientific ideation, and the imponderable body may be pictured as an indefinite nebula or plasma, constantly growing by accretion and constantly undergoing internal change. This plasma may best be portrayed as for the most part unorganized, with partially or completely organized nuclei and nodes and processes here and there; and there is a certain fitness in conceiving the organized tracts as near the surface, where the interactions between external and internal are direct and continuous. In this way the intellectual product of the world may be likened unto a nebula, a cloud gathering in a supersaturated solution, an ameba, or a brain—it may be viewed as a chaos more or less advanced on the way toward cosmos. The image is ideal; it serves merely as an aid in grasping and formulating widespread notions concerning knowledge as an elusive and intangible yet vigorously real and important Something; but it is not essential to correct understanding of the main facts in the growth of Knowledge.

Knowledge is born of the individual brain fertilized by indirect contact with other brains, and is given unto others with a degree of freedom varying with the disposition of the individual and the perfection of his mechanism for conveying thought—gesture, picture, speech, writing, printing; the growth of Knowledge keeps even pace with the acquisition of structures and devices for its expression, and it is a pleasant and significant fact that in general the disposition to dispense Knowledge grows strong and active just as the dispensing mechanism improves, though usually lagging a little behind—much as the verdure follows the vernal shower. So the stage of individual knowledge is initial, the stage of common knowledge consequent; so also individual knowledge is barren and unproductive until turned into the general fund to increase and multiply an hundred-fold; and so, too, there is progressive growth from the initial stage of individual discovery or invention, through many ill-defined yet successively higher and higher steps, well toward the mature stage of general possession. It is needful to observe that the body of general knowledge can never quite equal the aggregate knowledge possessed by individuals; although stimulated by others, each active individual knows something more than he is able to tell, be he never so free in disposition and facile in expression; and it is the never-ending process of coining and issuing and exchanging the precious product of the cerebral crucible that gives rise to intellectual property-right, and at the same time enriches the great plasma of Knowledge and maintains the activity essential to its existence. It follows—and this scientific certitude may be commended to a certain class of socialistic schemers—that the relation between individual knowledge and general knowledge is asymptotic, in that although the latter constantly approaches it never can reach the former; indeed if general knowledge were ever to overtake individual knowledge, through suspension of the laws of intellectuality (undoubtedly immutable as those of vitality), the special province of mental activity would be annihilated and the body of Knowledge would sink into quiescence—and, in the intellectual as in the vital, quiescence is death.

As Knowledge is produced and given unto others the freedom of giving is governed by numberless conditions, including the perfection or imperfection of the mechanism for expression, the avidity or indifference of the chosen beneficiaries, and the price fixed by custom; and so it happens that certain discoveries and inventions are directly communicated only to limited groups of individuals, who thereby accumulate special knowledge. In this way cliques and trades and guilds arise and the germ of caste is planted; in this way, too, specialists grow up through the indifference of the masses and their inability to keep pace with the investigator whose energies are directed along a single line; and eventually, among the most enlightened peoples, special societies are formed for the purpose of fostering or diffusing discovery and invention and thereby rounding out the fecund plasma of human Knowledge. It may be noted that special knowledge is nearly as barren and unproductive as individual knowledge, and is soon blasted by the poison of its own egoism, unless the richer part of its substance is guided toward the general mass—to do work as it advances, for it is by no means to be forgotten that the activity of the great body of Knowledge culminates in the province or zone of special knowledge, and that herein lies the leaven that leavens the whole.

During recent centuries and especially during recent decades specialists engaged in creating knowledge have studied Knowledge itself in the hope of learning its nature and origin; and most of these students have become convinced that the basis of real knowledge is found in the facts of the cosmos as revealed by observation or established by experimentation. So the acquisition of Knowledge begins with noting particular facts and advances to assembling or grouping these facts—*i. e.*, proceeds from observation to generalization; the second process involves the elimination of the unlike or incongruous, and this leads to discrimination and to the recognition of analogies. In general terms and somewhat provisionally, it may be said that the analogies so recognized constitute laws of occurrence, which may themselves be generalized, and that the requisite discrimination of analogies leads to the recognition of homologies, or laws of occurrence and sequence combined; the framing of analogies and homologies being legitimate inference, which develops in hypothesis and matures in theory or doctrine to be finally formulated in laws or principles. Knowledge produced in this regular and simple manner is commonly called inductive, though there is always a deductive element coming over from that general intellectual possession by which even the closest specialist is guided in greater or less measure. Now it is to be noted that acquisition of Knowledge is largely spontaneous and unconscious—that apperception lags far behind perception, and that only the adolescent and mature among men and peoples are clearly conscious of their own mental processes, or indeed of the existence of mental process; it follows that most of the processes just outlined are ill-recognized or not recognized at all, even by the very makers of Knowledge. Moreover the later steps in intellectual acquisition are commonly the first to be consciously noted, so that the majority of men, even unto the present day, have failed to recognize the true source of real Knowledge, and have appealed to all manner of mysterious and extravagant sources for part or all of the intellectual wealth of the world; for while the more complex processes alone were recognized inference was exalted and observation was contemned, subtle imagining ran riot and overshadowed sober reason, and scholastic learning—which the practical makers of progress fortunately ignored or repudiated—grew into a labyrinth of deductions from vain postulates and hazy lucubrations. A new epoch dawned when Bacon formulated the inductive method—though he knew not that the method was old as the human mind, and that he but recognized that which all men do, whether consciously or unconsciously. Reviewing the course of intellectual acquisition from observation through generalization and inference and theory unto laws of occurrence and sequence, Knowledge may be classified by degree of development, and the simpler and more primitive (whether burdened by assumption or not) may be called empiric, while the more definitely organized product of special study may be called scientific; and, remembering that the processes of acquiring Knowledge are partly unconscious, that portion which is organized unconsciously may be classed as common sense, or sagacity, or the wisdom of experience, while the consciously organized portion may be called science. This summary of the mode of organizing Knowledge may be trite, yet it serves to show that the methods of the student of Humanity are in no wise different from those pursued in the physical and natural sciences.

In brief, Knowledge is ever passing from the individual to the common and from the special to the general, and thereby its quantity is constantly increased and its utility extended; during recent times it is passing also from the empiric to the scientific, and thereby its quality is improved and its beneficence multiplied.

Of the Quickening of Science

When the history of the class of knowledge called Science is scanned, certain tendencies or directions of growth are perceived; and scrutiny shows that these tendencies are in harmony with the course of development of knowledge in general.

1. In general, observation and research begin with the rare or remote and proceed toward the common and the near. This tendency is revealed when the several branches of science are compared. Perhaps the oldest science is Mathematics, which began before history, so that its origin is obscure and cannot certainly be traced to definite objective basis; but the nearly contemporary and closely related science of Astronomy rested on observation of the celestial bodies—though the observation was long clouded by the mysticism of astrology. Then as wits were sharpened by mathematical research and astronomical observation, exact knowledge was gradually brought down to nearer bodies and under the guidance of every-day observation; and thus the science of Physics arose so gradually and inconspicuously that its early history is lost. Later, shrewd hermits and beldams wrought magic by means of rare substances, and alchemy grew up; and as time passed the manipulations were extended to common things and the ban of secrecy was gradually broken,

and so Chemistry arose. These four branches of knowledge concerning the inorganic interacted with mutual benefit, and for several centuries constituted Science, in contradistinction from the vast body of vague thought comprised in scholasticism and folklore, and from the more useful body of commonplace knowledge not yet consciously organized. Still later attention was attracted by things nearer to mankind in place and character, and first plants and afterward animals were studied systematically, and Botany and Zoology arose; but for a long time the most attractive organisms were the unusual and therefore striking, or the specimens brought by travelers from distant lands—indeed, even during the present half century, scientific museum administrators are embarrassed by the tendency of the collector to neglect the common and collect the unusual in his own locality, and it is only within a generation or two that the ordinary plants and animals supplying mankind with food and clothing and other everyday commodities have been subjected to scientific research. In like manner the science of Geology began, soon after botany and zoology, with the study of rare minerals and the ancient rocks of remote mountains; gradually the research extended to the nearer hills and valleys and the later formations; and it is only within the present generation that the soil-making deposits on which human life so largely depends have been brought under scientific examination. Last of all the scientific research beginning with the stars and passing to minerals and plants and animals, and through the soil on which plants and animals live, reached man himself; yet the studied observation began not so much with fellow-citizens or fellow-subjects bound to the student by ties of consanguinity and affinity as with the abject savage or half-clad barbarian of distant lands; and even today, and in the most enlightened nations of the earth, the pictures brought up in most minds by the term Anthropology are those of alien and inferior peoples, or of human curiosities and monstrosities exhibited in midway plaisances if not in circuses and dime museums. Even in scientific circles—yea, among those ranked as anthropologists—there are many who habitually restrict the term to the purely animal side of Man, and ignore that broader and nobler side which distinguishes mankind from all other things. So, whether Science be viewed in general or in detail, it is found that its progress is toward the ego—toward the everyday and commonplace perhaps, yet ever toward the more important because the nearer, the more useful because the commoner; and the more nearly it approaches the more clearly it is seen that Science dignifies both student and object of study—that exact knowledge, with Midas touch, turns dross to gold.

2. In general, research begins with the abnormal and proceeds toward the normal: Judging from the habits of present-day barbarians, among whom the tempest is studied and the zephyr ignored, the comet remembered and the planet forgotten, the pre-Chaldean astronomers based their first celestial observations on the erratic wanderers rather than the orderly travelers of the sky; and in all ages prodigies—the bizarre and ill-formed, the gigantic and dwarfish —have been the first to catch and the longest to hold attention among casual observers and specialists alike. This tendency toward noting the abnormal, like that of regarding the rare rather than the common, is the easily besetting sin of the touring naturalist and local museum collector, the joy of the unscientific and the despair of the scientific among museum administrators. Clearly seen in geology and zoology and botany as the vestige of a primitive past, this tendency to perceive only the abnormal is still strong, indeed almost dominant, in the younger science of anthropology: today distorted or wounded or cachectic skulls from the ancient ossuaries of Africa or the huacals of Peru are esteemed far above normal crania of a normal people who have by normal activities aided in making civilization and ennobling the world; today the platycnemic tibia and perforate humerus of questionable significance are exalted above the normal members occupied in the march of progress and the conquest of lower nature; today there are a flourishing subscience called criminology and a fantastic fad of extolling and magnifying degeneracy, while the upright in mind and the sound in body are relatively neglected—yet this apparently morbid taste but reflects a tendency of the human mind, and is the promise of better things when the intellect awakened by the abnormal acquires the power of appreciating the normal. Unremembered millenniums of mystical shamanism were required to produce pathology and therapeutics, and centuries of pathology were needed to produce sound physiology and etiology, and in like manner there were generations of mystical and irrational psychomancy before students were able to recognize a basis for

the modern and most promising science of psychology. It smacks of the paradox to say that the beginning with the abnormal is the normal course in the making of science; yet the history of each and all of the sciences shows that observation on the abnormal has always led attention to the normal, just as observation on the remote has ever guided attention toward the near; and it is but natural that the youngest of the sciences should yet retain vestiges of undue magnification of the abnormal.

3. In general, scientific determination proceeds from the qualitative to the quantitative. This tendency is displayed by every branch of science, and so conspicuously that it may be deemed characteristic. It is in accordance with this tendency that estimate precedes weighing and reconnaissance goes before surveying; and it is under the same tendency that scientific progress involves constantly increasing refinement in observation and ever-growing accuracy in definition.

4. In general, scientific interpretation proceeds from the formal to the physical,[1] from the material or the inert or the static to the dynamic. The positions and movements of the moon and planets were determined with fair accuracy before Newton discovered that the paths of these and all other celestial bodies are fixed by gravity, when this discovery afforded the means for determining position and movement with incomparably greater accuracy. The physical and chemical effects of heat were recognized for generations, and were ascribed to the hypothetic element phlogiston, or the imaginary fluid caloric, long before Joule and others found it to be merely a manifestation of molecular motion; whereupon physics and chemistry were revolutionized and the forces of nature were gradually harnessed many times more effectively than before.

The ancients recognized vitality and ascribed it usually to a material something joined to the matter of the body: Some twenty-four centuries ago sagacious Heraclitus conceived life as a universal fire, and less than five centuries ago Paracelsus, and after him van Helmont, wrote of the anima mundi, or archeus, having in mind a vaguely imponderable thing akin to the so-called astral body which votaries of an oriental belief imagine themselves able to materialize out of the depths of transcendental reverie; two centuries ago Hoffmann and other anatomists spoke habitually of the vital fluid as contemporary physicists of phlogiston; and within a hundred years leading physiologists, like Hunter, thought and wrote of the "diffused vital material." Less than a quarter-century ago Barker was deemed bold unto recklessness for undertaking to correlate vital and physical forces,[1] and many heads were shaken doubtfully when, in his presidential address before the American Association at Boston in 1880, the same brilliant experimentalist argued from the applications of Mosso's plethysmograph that mental force also may be weighed and measured, so that it must be regarded as interconvertible with other forms of energy;[2] yet half a generation of organic chemistry and physics has established these revolutionary propositions beyond peradventure and introduced a new era of biologic research.

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[1] As defined by Le Conte in a notable article "On the Structure and Origin of Mountains." American Journal of Science, third series, vol. xvi, 1878, page 107.

The tendency toward dynamic interpretation is well shown, too, in geology: In the infancy of the science formations and the extinction of faunas were ascribed to extranatural cataclysms, the opening of valleys and the shaping of hills to ill-conceived or inconceivable catastrophes; with Lyell—a personal associate of scientific men now living—came the doctrine of uniformism, under which it is recognized that existing rains and rivers and silt-distributing waves are competent to produce the land-forms and formations of the earth, provided time enough be allowed them; the present generation of geologists, beginning with Powell and including two score others, have scanned the pages of the Great Stone Book so well laid open by Colorado and other rivers, and have learned to read earth-history from land-forms as well as formations, and have shown that at least a portion of those earth crust movements which were sheer mystery to Lyell result from the slow transfer of rock-matter by the action of running water. As interpretation grew definite and the mystery of earth-making dissolved, the classification gradually changed from chiefly material or static to chiefly dynamic; for a time the formations were classified by the processes of accumulation; and now the foremost geologists classify earth-science primarily by the great agencies of earth-making.

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[1] "The Correlation of Vital and Physical Forces," University series, number 2 (Van Nostrand), 1875.

[2] Proceedings of the American Association for the Advancement of Science, vol. xxix, 1881, page 12 et sequentia.

In anthropology interpretation has not yet grown definite and there are nearly as many modes of interpreting as there are men to interpret, yet even in the short and complex history of this youngest of the sciences the general tendency appears; for the earlier classifications were based on bodily or somatic features, while the more advanced among current classifications rest either on collective attributes or on the activities of the human groups—*i. e.*, the older classifications indicate what men are, the newer indicate what men do. Only half a generation past was it definitively suggested that human mentality is a form of energy, but already the testimony of the plethysmograph has been corroborated in so many ways and so widely extended that most scientific students of mental phenomena assume, either explicitly or implicitly, the essentially physical character of intellectual action; and in this writing it is assumed that intellectual energy is paramount in that it is able to control other forms of energy and make conquest of nature through invention and construction, and the faculties and works of man are classified and interpreted accordingly.

So in astronomy and physics and chemistry, and equally in biology and geology, the progress of Science may be measured by the ever-increasing recognition of the dynamic aspect of phenomena, of the physical forces by which the material things are moved; with the recognition of inherent energy or motion, observation progresses from the merely qualitative to the quantitative, and constantly increases in refinement; and in view of this progress in other sciences it can hardly be regarded as premature to attempt the extension of quantitative measure and dynamic interpretation to that side of anthropology which deals with the purely human attributes.

5. In general, scientific interpretation progresses from the stationary to the sequential; for the idea of action engenders the idea of succession: The Chaldean shepherd, the Egyptian soothsayer, and the Peruvian priest, like the earlier oriental astrologer, probably first took note of the celestial bodies as striking features of the cosmos, and later observed their rhythmic procession with such care that cycles were established and eclipses and other prodigies were foretold long before the true structure of the solar system was understood. These ancient observations and interpretations must have implanted that idea of the uniformity of

nature which has borne so splendid fruit during the present century; the budding notion found poetic expression in pleasing fancies of firmaments of crystal and the music of the spheres; yet it was not until the germinal idea was fertilized by the Newtonian law that the marvelous measure of celestial rhythm came to be known. Led by the planless experiments of daily toil, the mechanic—forerunner of the physicist—was the next to lay hold on the notion of uniform succession; it grew with the centuries and spread into the neighboring domain of chemistry, where it vitalized the dynamic interpretation of chemic union and aided in producing Avogadro's law, which, according to Cooke, "holds the same place in chemistry that the law of gravitation does in astronomy,"[1] and forms the basis of what has justly been called the New Chemistry. This law, like all others in science, afforded a means of prevision, or of presaging the unknown in terms of the known, and thus of testing its own validity; and as test followed test the idea of orderly succession grew until, with the aid of refined observation and the guidance of special experiment, it matured in the doctrine of the persistence of motion, the key-note of modern science. Here was a vantage point from which the astronomer was enabled to study the celestial bodies, especially our own sun, not merely as masses, but as chemical and physical assemblages; and so arose the line of research sometimes called celestial physics, but defined and dignified by Langley as the New Astronomy,[2] which has already afforded a means of analyzing the constituents and measuring the movements of several among the myriads of other suns than ours. True, each of these strides in the advance of physical science represents progressive appreciation of cosmical forces; yet still more fully do they represent progress in recognizing orderly sequence and causal succession in the movements of molar and molecular bodies.

Borrowing from physical science trenchant ideas concerning force and succession, even the earlier biologists analyzed the mechanism of living things and slowly stripped away the primitive panoply of mystery or divinity in which the infantile imagination, whether of men or races, has always enveiled vitality. Lamarck was one of the first to extend the idea of orderly succession to organisms, and although his special hypothesis of development has fallen into abeyance, it has features which anthropologists do well to remember; then came patient Darwin and doughty Huxley and studious Spencer with the definite doctrine of organic evolution, which spread from man to man and from land to land, producing the greatest and quickest intellectual revolution in the history of the world. Albeit revolutionary, the Darwinian doctrine was but the biotic complement of the physical doctrine of the persistence of motion; and the two doctrines are twin buttresses on which the symmetric structure of modern science is supported. Through the later doctrine the world and the things thereof were transfigured in a new beauty and perfection, the universe was invested with a new glory, and the narrow notion of breaks in the uniform course of nature by special fiat lost hold on the scientific mind forever.

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[1] "The New Chemistry" (International Scientific Series, VI), 1875, page 13.

[2] "The New Astronomy," 1888, chapter 1.

It chanced that while the ferment of evolution was still fresh a trio of American geologists (Powell, followed by Gilbert and Dutton) entered the inspiring region traversed by Colorado canyon; and before their work was done the germ of geomorphy, or the New Geology, was planted—it was realized more clearly than ever before that the hills are not everlasting, but ever-changing, and that the features of every landscape tell an eloquent tale of continental evolution in which competent cause and commensurate effect follow ever in ceaseless succession through the eons of earth-making. The task of the geologist is not ended, indeed is only well begun; yet here, as in other sciences, the reign of law is realized and the day of appeal to chance is past.

When Huxley sought "Man's Place in Nature,"[1] and still more, when Darwin traced "The Descent of Man,"[2] the fruitful idea of the uniformity of nature was pushed into the domain of anthropology, and has now guided for a generation those branches of the science which deal with the animal side of Man; it is true that the rhythmic sequence of cause and effect has hardly been extended so far as to cover the delicate and elusive attributes of Humanity, but this extension is the motive of many investigators, the aim of the present writing. Already the broad realm of Humanity is fairly defined, and the distinctive form of developmental succession proper to this realm is fairly outlined, so that the distinctness of the science of human attributes has been made clear; for while stellar and molecular and organic development are evolutionary in that the main tendency of change is toward differentiation, the development of humanity is involutionary in that the main tendencies are toward integration and combination. Conformably to the fundamental facts of the great realms of nature, the earlier sciences are largely, perhaps chiefly, analytic, while the science of humanity is largely, perhaps chiefly, synthetic; and its votaries seem to find reason for figuring it as the central dome, crowning and conjoining the separate columns in the ideal pantheon of Science. If the confidence of the votaries is just, the youngest of the sciences may be expected to repay with interest all that it received from the several branches of knowledge whence it sprang. Already, indeed, it has thrown light on the course of organic development through researches on the human body, and has begun to guide the acquisition of knowledge through researches on the human brain and its functions; already it is contributing to the physical sciences—*e. g.*, through the refreshing Powellian doctrine of conservation, or of common persistence of motion and matter in the ultimate particle, whereby ideas concerning the mechanism of the universe would seem to be immeasurably simplified and extended; and there are other ways in which the youngest science is daily contributing to the stock of definite knowledge—their name is legion.

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[1] First publication in 1863.

[2] The first edition of this notable work appeared in 1871.

So it is that science has always progressed from the rare to the common, from the remote to the near, from the abnormal to the normal, from the merely qualitative to the quantitative, from the merely material aspect to the physical aspect, from the primitive faith in fixity to living realization of causal succession. At first sight this progress may seem puzzling, even paradoxical; yet the general course is but an expression of the order of intellectual operations pursued in scientific research: The first step is observation, which is easy when the objects observed are isolated or distinct, increasingly difficult as the objects increase in number and similarity; the second step is generalization, which is relatively easy when the objects examined are few, relatively difficult when they are many; while the ancillary process of discrimination of the incongruous likewise grows laborious with the multiplication of objects and similarities. Accordingly, it is easy to study the rare, the remote, and the abnormal, and as faculty is strengthened by exercise it gradually becomes easy to progress toward the common, the near, and the normal. So also qualitative determination is easy, quantitative determination difficult—indeed exact quantitative work is impossible without careful training, as numberless surveyors and teachers can testify. In like manner interpretation in terms of the material, coupled with appeal to the supernatural when obstacles are encountered, is relatively easy and characteristic of the indolent or immature mind, while the firm grasp of analogy and homology, and the clear recognition of energy and sequence, require both native capacity and systematic training. Accordingly scientific interpretation in terms of action and succession is the end of mental effort, and may be regarded as the highest expression of intellectuality. This correspondence between the method of research and the history of Science throughout the centuries amply attests the excellence of the method. Yet it is not to be forgotten that just as intellectual grasp strengthens so interpretation is simplified, partly through the elimination of that question-begging mysticism which pervades all primitive philosophies, partly through clearer arrangement of facts and relations; and as interpretation grows simple three especially noteworthy effects follow: (1) Each step in interpretation makes the later steps easier; (2) as the labor lightens, more energy is left for the next task, and the mind of the student pushes into new fields of study, and from time to time organizes new branches of inquiry; and (3) with each extension of inquiry mental faculty is stimulated and strengthened. These tendencies are clearly indicated by the birth and growth of new sciences recorded in the history of research; beginning with the celestial bodies, it has extended to mechanical bodies, vegetals, animals, the earth itself, then to the human body, individual and collective; and now it is reaching out toward the special attributes of mankind, the things nearest to human welfare and happiness.

Of the Sciences of Animal Man

The domain of anthropology is vast, and, partly by reason of its very magnitude, is sometimes deemed indefinite; yet in the light of the history of science in general its limits and subdivisions may easily be outlined.

History and analogy combine to show that the study of Man began with wounds and diseases and grew into surgery and medicine, which were at first thaumaturgic, but gradually became rational or scientific;[1] and in this way definite knowledge of the human body gradually accumulated and Anatomy and Physiology, with various ancillary sciences and subsciences, took form and function. Meantime the organs of the human body were compared and identified with those of beasts and birds (which were long the better known), and comparative anatomy was established; but it was not until observation and generalization were fertilized by scientific zoology that the study of structures in their functional aspect took shape in Morphology. Under the influence of humanitarian therapy and the unprecedented stimulus of the Darwinian doctrine of development, the investigations of the last century, and particularly the last quarter-century, have extended from structures to functions, and these, through the fruitful science of Embryology, to human ontogony and phylogeny—to the individual and generic evolution of Man considered as an animate organism. Accordingly there are several branches of science which deal alike with the human organism and the various other animal and even vegetal organisms of the great vital series in which Man is usually, though not invariably, considered the culminating and crowning form. Here anthropology and biology blend; but it is convenient and desirable to distinguish that division of the Science of Man which deals with the organic features of the order Bimana, and this science or subscience is frequently called *Somatology*. Although the oldest and the simplest among the divisions of the anthropologic sciences, Somatology comprises various special branches of knowledge commonly classed as sciences, including Pathology, Physiology, Etiology, etc, representing the specific methods and purposes of particular classes of investigators.

The early books and maps of civilized nations show that explorers and pioneers were profoundly impressed by the far-away peoples encountered in their wanderings; there are not only accounts but pictures of headless men with faces in their chests, of cyclops with single eyes set skyward, and of other impossible monstrosities in human semblance; even since zoology became fairly definite, accounts of ten-foot giants in Patagonia and three-foot pygmies in central Africa and other lands remote or hidden have gained currency and credence. As exploration continued, the unconscionable extravagancies of vision were gradually corrected, and the explorers came to see alien races in proper form and something like proper stature; yet the interest in the stranger peoples remained unabated and led to systematic observation and record. Borrowing methods from biology, the observers or their interpreters sought to classify the men of different continents and provinces and islands by somatic characters—by stature, color of skin, color and texture of hair, color and attitude of eyes, form of feature, form and size of skull, peculiarities of long bones, etc.; and, as the researches became definite and fruitful, they were combined in a science of races, called *Ethnology*. This science has much in common with biology, and is a direct outgrowth from that group of sciences pertaining to the human body combined under the term Somatology.

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[1] The genesis and development of surgery, and incidentally of medicine, are discussed in a memoir on "Primitive Trephining in Peru," Sixteenth Annual Report of the Bureau of American Ethnology, 1897, especially on pages 19 and 72.

After centuries of unscientific and unsuccessful search for the seat of the soul through baseless deduction and blind introspection, certain thinkers began to profit by contemporary researches in anatomy and physiology; and as eye and mind were trained—even as the eye and mind of the traveler were trained not to make monstrosities out of unfamiliar races—the form and function of the nervous system were gradually recognized, and the dominance of the brain was finally established. Only within a generation or two has the brain been investigated in a scientific way and with due appreciation of the importance of that marvelous structure preformed in the articulates, potentialized throughout the long line of vertebrates, and perfected in the ultimate mammalian form of the genus Homo; yet during the present quarter-century the research has been organized in a science already cultivated in many lands and taught in most of the leading universities. The earlier promoters of this science approached the subject haltingly from the speculative or deductive side, and perhaps for this reason the science is named, not so much from the organ itself as from its product, *Psychology*. This modern science is not to be confounded with certain fantastic notions sometimes foisted under the same designation, which do little more than obstruct progress; the parent stock of the science was, indeed, speculative—as is most knowledge in the beginning—but so soon as the graft of Somatology was affixed it became fruitful. It is to be noted that while Somatology is essentially biotic and Ethnology is biotic in so far as it rests on bodily features, Psychology pushes beyond the domain of biology proper, partly in that the human brain owes its perfection of development to the essentially human attributes, partly in that the science, as commonly defined, embraces both brain and mind—both organ and product.

So there are three well-established and widely recognized sciences whose object-matter is Man considered as an organism. By some students—especially those of past decades—they are held to constitute the whole of Anthropology; by others they are combined as Physical Anthropology and regarded as including only the animal side of Man but excluding nearly the whole of the essentially human side—nearly but not quite the whole, since the field of Psychology is common ground. This is the view of several modern anthropologists, and is that held in this writing.

Of the Potency of Devices

Passing from that portion of the domain of Anthropology which deals with Man as an animate genus, there is found another and still broader portion occupied by that which Man does as a sentient, volitient, and intelligent being; it is true that this portion of the domain is less definite than the other, yet in the light of intellectual progress its limits and subdivisions also may be outlined, albeit in some measure provisionally.

The early explorers who came home laden with travelers' tales sometimes brought also more tangible cargo in the form of strange wares; and so the handiwork of the world gradually came under the observation of students, and in time museums were built largely to accommodate the constantly increasing collections of primitive and alien arts. Meantime observent persons in many lands were attracted by relics of archaic culture in the form of implements, weapons, ornaments, apparel, and habitations, as well as burial places sometimes containing the bones of the ancient artisans; and these, too, were collected, and museums were built to accommodate them in connection with the artificial material gathered among the living peoples of distant lands. As collectors and collections multiplied the work was organized; and although the initial stimulus came from observation in remote countries the interest grew inward—as is the way of advancing knowledge—and the local research for the rare relics of past ages was the first to receive name and character as the science of Archeology. As observations multiplied resemblances were found between the culture-products of remote times and remote places; the arts of primitive peoples were found to vary in a manner corresponding more or less closely to race; and thereby ethnic research gained new impetus and served in turn to guide research in the prehistoric. So Archeology and Ethnology became mutually helpful and grew apace and came to be intimately associated in most minds, despite the fact that the one is concerned primarily with what man is, the other with what man does; and in some circles these branches of inquiry came to be regarded as constituting the whole of Anthropology.

At first the products of ancient and alien handiwork were accepted at their token value, much like the chemic elements before Avogadro, the planetary movements before Newton, our sun and others before the doctrine of the persistence of motion, the organic species before Darwin; but within a generation or two it has come to be realized that they possess an innate value as exponents of intellectual activity—as medals of human creation, collectively attesting the birth and growth of discovery and invention, design and motive, and all other human faculties. Perhaps the time has not come for defining this stage in the progress of anthropology; it may be that the transition is not yet complete, or that the relations are too complex for easy grasp; yet it seems clear that when the anthropologist first saw in the implement of shell or stone an index to the mental operations of the implement-maker hardly less definite than the written page to the thought of the writer, the Science of Man rose to a higher plane with a bound comparable to those marking great epochs in the development of the other sciences.

Now in Science each advance gives a new standpoint from which a broader view may be gained, and with the recognition of what may be called the dynamic aspect of artificial objects, the way was prepared for further progress. It was soon perceived that the simplest devices are supplements to or substitutes for bodily organs—that the knife of shell or tooth or stone is a supplement to teeth and nails, that the hammer-stone multiplies the efficiency of blows, and that the missile is equivalent to an indefinite prolongation of reach; and accordingly it was realized that, in so far as he is a maker and user of implements and weapons, even the lowest savage rises above the plane of purely animal life. It was next perceived that even the simplest devices react on the organisms in various ways: The substitution of the shell knife for nails and teeth diminishes the exercise and hence the vigor of these organs, and removes them from the category of characters subject to development through the survival of the fittest in the strife for existence, so that in so far as he employs devices in lieu of organs the savage passes beyond the realm of organic development by natural selection; at the same time the exercise of making and using artificial devices in lieu of natural organs tends to develop distinctively intellectual or cerebral characters; so that the effect of competition in the use of devices is not only to remove Man from the realm of the biotic, but to set him on a definite course of development in a new realm—the realm of the artificial, or essentially human. As the view of the artificial continued to broaden it was perceived that while the simpler devices may appertain to individuals, they are not integral part of the individual like the organs which they supplement, but may and do pass from hand to hand and from group to group; also that the use of a device by one person prompts others to acquire and use similar devices, which they are able to do immediately through mere exercise of individual volition (rather than slowly through generations of natural selection), so that each discovery or invention is at once the germ of a line of devices and a stimulus to intellectual power; and thus it was recognized that there is a strong communal tendency in the realm of the artificial—that the development of devices tends toward interchange and coöperation, yet ever of such sort as to augment intellectual power and elevate the human above the subhuman.

In the light of the dynamic interpretation of devices it is easy to perceive the trend of superorganic succession, or development of the artificial, and to contrast it with the course of biotic evolution: The substance or substratum of the latter is living matter, that of the former any matter, living or dead, with which man chooses to deal; the mode of this is slow elimination of the unfit and unpremeditated survival of the fit, the method of that is immediate imitation and designed improvement of the ingenious; the tendency of biotic evolution is toward organic differentiation, that of artificial development mainly toward organic persistence with endless multiplication and integration of devices; the effect of the one is individual or egoistic, that of the other communal and altruistic. With the recognition of the dynamic and successional aspects of artificial devices, anthropology gained a new significance; for to its objects-matter in the form of the human body and human races and the human brain there was added the whole series of artificial devices and the exceeding potent intellectual activities which these devices represent—and this addition is the basis of what is here styled the Science of Humanity.[1]

Of the Activities of Man

When artificial devices were interpreted in terms of activities a new classification of human handiwork arose. At the same time the activities themselves became objects of research, which soon passed beyond the collections and extended to the multifarious material devices in daily use among living peoples in the various stages of civilization from savagery to enlightenment; still later the research was extended to the intellectual or non-material devices which preëminently distinguish mankind, such as law, letters, and learning in their numberless aspects. The study of the activities is now sufficiently advanced to indicate, at least provisionally, their relations among each other and to the merely organic processes; they may be arranged in the order of their affinity with the vital.

1. The primary activities of mankind are connected with more or less spontaneous sensations of pleasurable character. They arise and expand in fairly definite order; among known primitive peoples they appeal chiefly to the senses, and among more advanced peoples they appeal largely to the emotions and the purely intellectual faculties; they root in sports, games, and decorations, and mature in the fine-arts of painting, sculpture, the drama, poesy, and music—*i. e.*, they constitute the esthetics. The artificial devices growing out of these activities go far toward

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[1] The enlargement of the domain of Anthropology as here set forth is regarded as marking the most important epoch in the development of this science, one of the most important in the history of Science in general. Several investigators have contributed to it; perhaps the earliest, one of the most voluminous, and certainly the most original of these contributors is J. W. Powell, whose preliminary writings have appeared in a large number of addresses, official reports, and minor papers, though his final conclusions are not yet published.

filling those museums of the world devoted to archaic and ethnic material, and nearly a third part of current anthropologic literature is devoted to this class of objects and the activities which they represent. The activities and activital products form the objects-matter of a broad and fruitful field of inquiry known of late as *Esthetology*.

2. Intimately connected with the primary activities, and also originating in spontaneous vital processes though becoming dominant only by organization through exercise and volition, there are other activities tending toward the maintenance of physical welfare. From a simple beginning in occupations akin to those of the beasts, they arise and expand with each step in cultural advancement from savagery to enlightenment; at first confined to food-getting, they extend also to the making of apparel, the building of habitations, and eventually to the supply of intellectual demands—*i. e.*, they constitute the industries of common parlance. The material devices growing out of the industrial activities have enriched anthropologic museums almost equally with those growing out of esthetic activities; and probably a fourth part of the current literature of Anthropology is devoted to them and the activities by which they are produced. Together they form the object-matter of a large and rich science commonly called *Technology*.

It is to be noted that the greater part of the material investigated by the archeologist pertains also to the fields of Esthetology and Technology, though these are far broader in that they extend not only to a greater variety of activital products but to the activities themselves. It may also be noted that both esthetics and industries, originating as they do in vital processes, are primarily individual, though they become collective partly through combination with higher activities, while the higher activities of the series are primarily collective. It is noteworthy, too, that the two lower classes of essentially human activities rest on a material basis and are represented primarily by material devices, while the activities of higher planes rise above the material in their essential character and are only incidentally represented by material devices.

3. The activities of the third class are connected with collective relations; and since they grow out of consanguinity or family relation they may be said to have a biotic germ. In general,

the products of these activities originate as customs, which grade into regulations and later into laws, and are perpetuated in tribal, national, and other institutions. The activities and their products are most intimately connected with, and indeed form the chief basis of, cultural progress: In the first culture stage, corresponding to what is commonly called savagery, the collective or social relation is based on kinship traced in the maternal line; in the stage commonly called barbarism, social relation rests on kinship traced through the paternal line—these stages forming tribal society. In the third stage the social organization passes from patriarchy through feudalism, or an equivalent intermediate condition not yet formulated, to that stage of individual property-right in lands and goods which is commonly called civilization; and men are now passing into the stage characterized by intellectual property-right which is commonly called enlightenment—the organization in the last two stages being essentially nonconsanguineal and constituting what is sometimes called national society. The several activities and activital products belonging to this class form the object-matter of a fecund science commonly called *Sociology*—though the day of final agreement concerning the definition of the term is not yet.

4. In some measure the activities of the fourth class are an outgrowth of those of the third, since, although essentially superorganic, they may be regarded as a means of establishing and maintaining relation; they comprise expression, pantomimic, oral, and graphic. Like the other activities, they arise and expand in a certain order; beginning with what is somewhat incongruously called gesture-speech and with rudely articulate language, they mature in oratory and writing; and it is significant that the lines of development, so far as ascertained, run counter to those of biotic evolution in that they are almost wholly convergent instead of divergent, so that these activities pertain, in every essential respect, to the superorganic realm of Humanity. The principal activities are speech and writing; the tangible products are legend and literature; but the rich and ever-growing content of these products is Knowledge. The activities of expression and their products are commonly combined as the object-matter of another science frequently called *Philology*, though in this case, too, there is diversity in definition and also in designation.

5. There remains a class of elusive and protean yet immeasurably potent activities which come so near the ego and are so hard to grasp and difficult to convey that it would seem almost hopeless to attempt to define them; they are the essentially intellectual activities which form the motive and burden of expression, and their products comprise beliefs, opinions, knowledge, wisdom, and all other purely intellectual possessions. These activities also arise in a definite order, which is set forth incidentally in earlier paragraphs; and by most systematic thinkers they are considered to mature in Science. The activities and their products are so obscure and so diverse that they have not been combined and named in the vernacular; yet they are by some students regarded as the object-matter of one of the broadest of the special sciences, *Sophiology*.[1]

So there are five classes of essentially human activities and activital products, each so rich in phenomena and principles and so far distinct from all other classes of things as to constitute an adequate basis for a science; they are the fine-arts or esthetics, giving basis for Esthetology; industries, forming the object-matter of Technology; organizations or institutions, affording foundation for Sociology; language and literature, with their science of Philology; and the great plasma of Knowledge, forming the ill-defined but all-important object-matter of Sophiology. The five fields of research pertain primarily to Man and thus represent Anthropology; yet even casual survey of their extent and character renders it evident that they pertain not at all to the animal side of Man but wholly to that side which intellectual man alone possesses—they are five sciences of Humanity. Partly to distinguish them from the three distinct branches of knowledge concerning animal man, partly to fix their place in the body of Knowledge, they have recently been combined under the term *Demonomy;*[2] and this system of organized knowledge concerning wholly human things may fitly be designated the greater Science of Humanity.

Of the Potency and Promise of the Activities

As knowledge arises it is applied to the promotion of happiness and welfare; this has been true of unorganized and unconsciously organized knowledge throughout the history of mankind, and is especially true of definitely organized knowledge, which thereby becomes applied science. Now, knowledge concerning the human activities, even while unconscious or sub-conscious only, reacts upon and shapes the activities in such manner as constantly to increase their potency. Some of the ways in which the science of humanity stimulates and strengthens human activities are especially noteworthy:

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[1] Sixteenth Annual Report of the Bureau of American Ethnology, 1897, p. xviii.

[2] Fifteenth Annual Report of the Bureau of Ethnology, 1897, p. xix.

1. While the great domain of Anthropology is divisible into an animal side comprising three broad sciences and a human side made up of five still broader fields of research, other classifications are possible, and indeed of special utility when directed toward the practical application of the science to every-day affairs —for any assemblage of facts and relations may be classified in as many ways as there are purposes of classification. Experience shows that there is a peculiar advantage in classifying certain sciences by method of research rather than by the objects under investigation. Classified in this way, anthropology comprises (1) demography, *i. e.*, the enumeration and description of men, activital products, etc.; (2) human geography (or anthropogeography) dealing with the geographic distribution of peoples and their artifacts; (3) political economy, which is concerned primarily with applied social forces and their products; (4) history, which deals with the rise and fall of peoples and nations; and (5) philosophy, which scrutinizes materials and forces and sequences, and seeks the causes of growth and decadence among human things. This classification traverses the same domain as the more general one, and serves to bring out the same facts and relations in somewhat different light; *i. e.*, it is artificial rather than natural, technical rather than logical, subjective rather than objective, directive rather than creative—in brief, it pertains to applications rather than original research. For certain purposes it is desirable to combine the classifications and define special fields of inquiry by the coincidence between the two, as has recently been done happily by Giddings[1] and others; for the lines of thought represented in the two systems are strengthened by interaction—the one represents science, while the other may stand for statecraft or learning, and the two combine to advance mankind in knowledge and power.

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[1] "The Principles of Sociology," 1896, page 49.

2. At the outset the science of ethnology was closely affiliated with zoölogy, representing indeed little more than the concentration of biologic inquiry on a single order of animate organisms; but with the recognition of human activities, this science was raised to a new plane. The applications of demonomy in the classification of peoples and races are many and sweeping: already the natives of the western hemisphere are classified primarily by language and incidentally by other demotic features rather than by any or all biotic characters; already the great stages in human progress from savagery to enlightenment are seriated in terms of social organization in lieu of those of the bodily features with which the biologist is wont to deal; already the present-day ethnologist gives first thought to the arts, industries, institutions, languages, and ideas of the races rather than to any or all of those individual features comprised in stature and form and color; already indeed the recognition of human activities and the course of human development has served to revolutionize the science of races no less completely than the older sciences were revolutionized by recognition of force and sequence—and just as the New Astronomy, the New Chemistry, and the New Geology are distinguished, so it is meet to distinguish a New Ethnology as a science of artificially organized groups rather than of mere upright animals.

3. With the rise of knowledge concerning activities, it was perceived that the primary function and ultimate end of devices have always been to extend and increase human power, to enable man to control plants and subjugate animals, and to evade or utilize sun and storm—*i. e.*, to make conquest of lower nature; accordingly it was recognized that, while the human characters reflect environment measurably, as the purely biotic characters do fully, it is the essential tendency and character of man to control, rather than to be controlled by, his environment. This human power did not spring into being full-fledged—indeed science knows no Minervan birth—but grew up slowly through the exercise and gradual strengthening of volition and the evolution of design; so primitive peoples are partially controlled by their environment, while the control diminishes with successive culture stages up to that of enlightened man who dominates by multifarious devices nearly every physical force. Examination of the successive stages in emancipation from envi-

ronment brings to light many significant relations; thus it is found that when two or more primitive peoples of similar culture are subjected to similar conditions of environment their minds respond in similar ways, so that similar devices are discovered or invented; and recognition of this law of human progress has served to correct some of the most persistent misapprehensions by which anthropology, like all other sciences in their infancy, has been burdened. At the same time the recognition of progressively increasing conquest over the inorganic and the organic merely has served to define and dignify man's estate at the head of all nature.

4. Although certain human characters and characteristics were already under investigation, it can hardly be said that mankind in general came into the domain of scientific inquiry until the Darwinian doctrine of evolution was accepted; accordingly, anthropologists at first regarded Man as subject to the law of organic development through the survival of the fittest. Then came the recognition of activital development in contradistinction from organic development; and the pendulum of opinion swung back so far that most modern anthropologists implicitly assumed the human form—the form of the order Bimana, genus Homo, and species sapiens—to be fixed and final. It now appears that the pendulum swung too far; for a long series of highly significant yet but half appreciated observations indicate that, just as the human mind dominates the materials and forces of lower nature, so may it measurably control and fashion the organism in which it is embodied: already hygiene and gymnastics have improved unnumbered physiques and lengthened the days of thousands; already leading educational institutions maintain physical departments in which they undertake so to shape and strengthen the limbs and lungs and even the heart and bone of the matriculate that he may be graduated sound in body as strong in mind—yet these indications would seem only to point the way of progress and promise still better things in human development as later generations rise.

5. The most elusive attributes of humanity are those manifested in conduct and feeling and thought; yet, paradoxically, it was these obscure products of intellectual activity that men first sought to guide and control—for in every generation in each stage of culture, from the lowest savagery to the highest enlight-

enment, parents have essayed to train their children, while first the tribal leaders and later the sages and statesmen have semiconsciously or in full consciousness striven ceaselessly to shape the minds of the masses. So education, or the voluntary control of individual mentality for the common good, has affected profoundly the entire course of human development, and has served ever to widen the chasm separating man from the beasts. In the earlier stages of culture, as indicated by the customs of savages still living, education was limited to the lowly esthetic and industrial activities of the prime; for the primitive thinker ascribes motive, complex feeling, and all but the simplest actions to ill-conceived extraneous potencies against which it were bootless to strive. In higher savagery and in barbarism, the sphere of education extended to those features of conduct involved in the maintenance of tribal relations, and was effected partly by means of habitual appeal to the extraneous potencies, which were gradually crystallized in mythic systems themselves arising in a certain order determined partly by educational practice; for in much of savagery and in all of barbarism the sources of sentiment and motive are sought outside the individual and largely beyond the realm of the real. With the birth of civilization, education extended to feeling and thought, partly through appeal to ideal potencies, and there was a tendency to exalt the esthetic and neglect the industrial; and certain educational systems rose so high into the supernal or passed so far into the metaphysical as to lose sight alike of individual conduct and of the sources of real knowledge. In modern enlightenment—especially in America—the methods and purposes of training are shaped by science, and, despite the struggles of the scholastics, education is becoming revolutionized: With the recognition of an actual universe, knowable through sense and reason, training becomes definite in plan and useful in purpose; with the recognition of cerebral functions and of the influence of exercise in developing the brain, the scientific psychologists of the present decade have gone far in erecting a new platform for pedagogy; and with the recognition of the relations among the activities and the activital products of man, the normal course of intellectual development would appear to have been made clear—for it seems manifest that just as observation begins with the simple and proceeds toward the complex, and just as activity begins with the spontaneous and passes into the volitional, so individual and collective mentality must arise in simple and perhaps spontaneous action, to grow through habit into sentiment, and to mature through unconscious or conscious thought in definite motive. It is heterodox, perhaps in more senses than one, to affirm that motive—the noblest character of humanity—buds in spontaneous action, blossoms in subconscious habit, and attains fruition in the highest intellectual activity (whether unconscious or conscious) of which the individual or group is capable; certainly the affirmation represents complete inversion of a notion prevalent in savagery, dominant in barbarism, and gradually weakening through civilization; yet it is sustained by all that is known of the processes of acquiring knowledge, by the history of the growth of knowledge in general, and, indeed, by nearly all applied statecraft and most applied priestcraft throughout human history. The recognition of the genesis and antecedents of motive must afford a vantage point for a clearer survey of the vast field of human emotion, affection, passion, aspiration, disposition; and, at the same time, it cannot fail to give a key-note for improved education—for the still more complete control of Mind.

These are but a few of the many ways[1] in which the great science based on human activities tends to bring order out of that vast chaos of action and thought which has so long resisted analysis and synthesis—that last citadel of the unknown.

And briefly of the Basis and End of the Science of Humanity

Hitherto Humanity has been the theme of poesy and romance rather than of sober science. All men have perceived that their kind possess attributes distinguishing them from the rocks and plants and beasts of lower nature, yet for the most part these attributes were either ignored or transfigured into a dazzling halo which defied analysis none the less by reason of its subjective character; even today and in the most enlightened circles of the most enlightened nations there are few willing to consider, and content to consider dispassionately, the purely human attributes; but to these few the chaos of industries and ideals, of emotions and passions, of conduct and motive, and of all other things human, falls into a simple order nearly as definite as the order recognized in each of the older sciences—the order of human activities and activital products.

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[1] One of these is the control of society itself for the common good, as shown by Ward in his masterly memoir on "Dynamic Sociology," which it must suffice to mention merely.

Exact knowledge began with the remote and progressed toward the near; with every stage of progress it has been a power for the conquest of natural forces and conditions, has exalted brain-moved mankind above all brainless or small-brained creatures, and has made continually for human welfare and happiness; and now that the methods and purposes of science are extending to the human body and brain it cannot be doubted that these, like all other material things, will be controlled and reconstructed for the good and the glory of intelligent Man. This is the end of the Science of Humanity.

A PRIMITIVE MAYA MUSICAL INSTRUMENT

M. H. SAVILLE

The ancient forms of musical instruments known to have been used in Yucatan have been almost entirely superseded by those introduced since the Spanish conquest, and the sound of the accordion and the twang of the guitar are now to be heard in every village. In some of the interior pueblos the *tun-kul*, or ancient wooden drum, is still used on feast days.

During the winter of 1890–'91, while engaged in explorations at the cave of Loltun on the hacienda of Tabi, we employed a number of Mayas who came from various small villages in the interior of the country, remote from Spanish influences. Camping near one of the entrances of the cave, their evenings were passed in singing plaintive melodies in their native tongue, accompanied by a primitive form of stringed instrument which I have never seen described. This instrument, called *hool*, is made by stretching a piece of rope-like vine, called *ohil*, between the two ends of a pliable piece of wood, making a bow about two feet in length. One end of this bow is placed near the face, about one-third of the distance from the end, so that the mouth covers but does not touch the string, forming a resonator. Between the string and the bow a piece of wood is placed in such a manner that it may be pressed against the string or relaxed at will. The tones are produced by tapping on the string, thus producing a sound somewhat resembling that made in playing a jews-harp, but more agreeable to the ear. The different tones are produced by the pressure or relaxation of the stick upon the string and by the opening and partial closing of the mouth over the same. This instrument is used by the Mayas for the *jardanas* or native dances, the tune being a weird though not unpleasing one, and constantly repeated with but little variation during the evening. I found that it required considerable skill to manage the bow and much practice to play it, but many of the Indians were quite skillful in rendering the principal tune used. The bows were cast aside after use, and I observed no attempt on the part of the natives to make them elaborate or to decorate them in any way.

NOTES AND NEWS

A NOTABLE FEATURE of the many preparations made for the reception of the British Association for the Advancement of Science at Toronto, on August 18, was the issue of an exceedingly convenient "Handbook of Canada." It is a 16mo volume, IX + 415 pages and a number of lithographed charts and diagrams, neatly bound in cloth. It comprises, Part I, The Geography, Geology, and Biology of Canada; Part II, History and Administration of Canada; Part III, The Economical Resources, Trade, and Population of Canada. Students of anthropology will find special interest in the earlier chapters of Part II. The first of these is a summary account of the ethnology of the aborigines, by Dr A. F. Chamberlain, of Clark University. He classifies the Canadian Indians linguistically as: I, Eskimo; II, Beothuks; III, Algonkins; IV, Iroquois; V, Sioux; VI, Athapascans; VII, Kootenays; VIII, Salish; IX, Kwakiutl-Nootkas; X, Tsimshians; XI, Haida. The leading characteristics of each of these groups are set forth summarily in the 20-page chapter. Reference is made also to the Chinook jargon, and to various general conditions and problems. A note on the ethnic affinities of the present inhabitants of Canada, by Professor James Mavor, and a note on the settlement of New France, by Benjamin Sulte, are appended. Chapter II is an admirable sketch, by Professor George M. Wrong, of the history of Canada from circa 1000 to 1873, with some account of subsequent episodes and present conditions. The outline of constitutional history and system of government, by Dr J. G. Bourinot, forming chapter III, and a sketch of education in Canada, by Honorable G. W. Ross, forming part of chapter V, are also noteworthy to students of institutions. As an indication of the interest taken in scientific matters by the intelligent people of Canada, the little volume is especially significant, and both in design and mechanical execution it is highly creditable.

OUR READERS will doubtless remember an article by Professor Edward F. Morse, in the Essex Institute Bulletin (vol. XXVI), on The So-called Bow-pullers of Antiquity, in which he discussed the use of an object found in tombs of the classical period, but without coming to a definite conclusion as to its purpose. Dr D. G. Brinton (Bulletin of the Free Museum of Science and Art, May, 1897) identifies these articles as specimens of the Greek *myrmex*, a weapon worn by pugilists strapped to the cestus and used like the fatal "knuckle-dusters" of roughs of the present day to enable the wearer to deal a heavier and more disabling blow. This use is confirmed by the shape of the object, which is in accord with numerous citations from Greek and Latin poets.

A PRELIMINARY ACCOUNT of Cushing's work in Florida has just been distributed. It is elaborated from a communication made to the American Philosophical Society November 6, 1896, and appears as an extract from the Proceedings of the Society under the title "The Pepper-Hearst Expedition, conducted in the joint interest of the department of Archæology and Palæontology of the University of Pennsylvania and the Bureau of American Ethnology of the Smithsonian Institution. A preliminary report on the Exploration of Ancient Key-dweller Remains on the Gulf Coast of Florida. Communicated by Frank Hamilton Cushing." It is an octavo pamphlet of 120 small-type pages, with numerous illustrations. The remarks made on the original communication by Dr Brinton and Professor Putnam, together with Mr Cushing's reply, are incorporated. To the many anthropologists who have heard vague rumors only of Mr Cushing's remarkable discoveries on the coast of Florida this brochure will be most welcome; but to these, as well as to those who have gained more extended knowledge concerning the nature and results of the researches, this preliminary account will be but a foretaste—for more extended descriptions and discussions, with numerous illustrations, are promised soon to be ready for publication by the Bureau of American Ethnology.

Dr J. Walter Fewkes and Dr Walter Hough are still in the field, making collections of prehistoric wares and incidentally gathering data concerning the living Indians of Arizona and New Mexico. Present indications are that the collections, though not so rich as those of last year, will be of special value in throwing light on the affinities and movements of southwestern tribes.

A TELUGU FOLKTALE.—While King Nandana was wielding sway over Malabar, a wrestler approached him and said that he had toiled hard and learnt the art of fencing and other similar arts, could fight with wild animals, and could even walk with a huge mountain on his head; but he had found no one except the king who could give him the wages due to his powers. He had come, therefore, to the king's presence to represent his grievances and earn a proper livelihood. The king heard him, and thought that such a warrior would be serviceable to him, and engaged his services at a hundred pagodas a month.

There was a huge mountain near the city infested with wild beasts which were causing great havoc among the people. The king therefore sent for the wrestler and said: "You declared, you know, that you could carry a mountain on your shoulders. A mountain there is in the neighborhood which is the cause of much suffering to the people. Take it away to a distant spot and return hither."

The wrestler assented to the proposal, and on the next day at dawn the king took him, with his ministers, priest, and a retinue of soldiers, to the vicinity of the mountain. The wrestler girded up his waistband, tied his turban, and stood ready. The king saw him and asked him why he hesitated, and called upon him to take the mountain on his head and go.

The wrestler replied, "Sir, I humbly gave you to understand that I could carry the mountain on my head, but I did not say that I could lift it up. Kindly command your soldiers, therefore, to tear the mountain up and keep it on my head, and I will then carry it to whatever place you may command me."—*G. R. Subramiah Pantulu in The Indian Antiquary, January, 1897.*

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ALTHOUGH THE ATTENDANCE was barely 300, the meeting of the American Association for the Advancement of Science, held at Detroit August 7–14, was, in the judgment of old-time members, one of the best in the history of the Association. All of the sections were well supplied with papers, and these, almost without exception, were of high character. The local interest was exceptional, as indicated in some measure by the unusually full and satisfactory press notices. The meeting was especially noteworthy for the large attendance at sectional meetings; as usual, the attendance culminated in the section of anthropology, where the average attendance during all the sessions of the entire meeting was estimated at 200; yet in several other sections the attendance was beyond precedent, at least since the sections were increased to the present number.

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THE SIGNIFICANCE OF JOHN ELIOT'S NATICK[1]

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The fact that this name, so closely identified with Rev John Eliot's life, survives to designate the scene of his mission, now a prominent town in Massachusetts, as well as to indicate one of the leading dialects of the Algonquian language, of which he has left some monumental examples, is deemed of sufficent importance to justify the appearance of this brief paper.

Deacon Joseph Ephraim, an Indian of the Natick tribe, who lived in the latter half of the eighteenth century, is reported to have given the meaning of the name "*Natick*" as a "place of hills." This was accepted at the time, and has been handed down in histories and biographies to the present day. It has been said, however, that Deacon Ephraim understood very imperfectly his native tongue. For that reason his interpretation has not been regarded as of much value by those who have made the language a study.

There is a village in Rhode Island bearing the same name, and mentioned in Dr Parson's Indian Names of Places in Rhode Island, as "*Natick* falls and village, *Natchick* hill." In a note on the subject, written in 1894 by Hon Amos Perry,[2] secretary of the Rhode Island Historical Society, he says: "Its Indian name was *Nittauke*, which, stripped of its superfluous letters (one *t* and the final *e*) and anglicized, became *Natick*." Its meaning is given in Roger Williams' Key to the Indian Language, volume 1, Rhode Island Historical Society's Collection, page 86, as follows: "Auke signifies earth or land; Nittauke signifies my land."

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[1] Read before the A. A. A. S., Section H, at Detroit, Mich., August, 1897.

[2] Book of Minutes of Col. John Jones, of Dedham, Mass., p. 13.

In a letter dated April 22, 1894, in same publication and following Dr Perry's remarks, Dr D. G. Brinton doubts the *Nittauke* derivation and "votes in favor of the native red man as against his scholarly white teacher." Accepting the meaning given by Deacon Ephraim, "a place of hills," and believing "the name *Natick* to be simply a shorter form of *Ma-natuck*, explained in Trumbull's Indian Names in Connecticut, page 21, as that of various prominent hills in that state, and signifying 'a place of observation or lookout'—as a place of observation probably some knoll near Natick, R. I., was prominent enough to receive the appellation."

In one of his letters connected with the Rhode Island State census of 1885, of which Dr Perry was the superintendent, Dr J. Hammond Trumbull expressed dissatisfaction with the Indian explanation as given in the foregoing, and also a desire to see the Indian records of the town of Natick, R. I., in the hope of being able to shed light on the mooted question.[1]

The publication of the foregoing by Dr Perry led to a letter from Mr C. A. Downs, of New Lebanon, N. H., which was printed in the publications of the Rhode Island Historical Society for January, 1895,[2] as follows: "*Natick*—R. W. gives *Nit-tauke*, my land, but he does not seem to use it as a name of a place. The idea embodied in this application of it to a locality was beyond the Indian mind. I agree with Dr D. G. Brinton in your Jones' pamphlet so far. I do not find in the word the least suggestion of a hill, neither syllable nor letter.

"The late Judge Chandler E. Potter, of Manchester, N. H., a good Indian scholar, makes the following note: '*Natick* means a clearing or place free of trees, from the Indian words *naa*, bare, and *auke*, a place, the *t* being euphonic.'

"Rasle's vocabulary gives: '*Nate*, bare or cleared; *Na-t-auke*, a clearing.' Rev Edward Ballard, in Geographical Names on the Coast of Maine, Coast Survey Report, 1868, gives *Naddock*, written *Nuttake*, the same derivation, and cites a Penobscot Indian as using the word *Nătuah* as meaning an interval. All this is reasonable—a probable source and meaning of *Natick;* but, knowing the literalness of the Indians in their names, I was not quite satisfied without some evidence that Natick, in whole or part, was a clearing, which no one seems to have undertaken to prove, so I began my search in this direction. In an account of the settlement I find this: 'In this place the grass was cut and timber felled,' etc. This shows that there was a clearing, for otherwise there would be no grass; and, so far as I am concerned, the question is settled—*Natick* means a clearing. This meaning rests on etymology and facts. No other does."

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[1] Book of Minutes, p. 14.

[2] New Series, vol. 2, p. 262.

The foregoing conclusions would be acceptable and the question settled if it were based, as Mr Downs states, on "etymology and facts;" but, alas! he is mistaken in his premises, for his authorities are, without an exception, in error or misconstrued.

In the first place, it would be well and highly desirable to learn in which Algonquian dialect can be found *naa*, "bare," and where in Father Rasle's Dictionary of the Abnaki appears "*nate*, bare or cleared; *Na-t-auke*, a clearing"?[1] The most diligent search through the principal grammars and vocabularies of the family fails to reveal any Algonquian radical with such meaning, and in fact there are grave doubts as to its existence.

Again, the Penobscot *nătuah*, quoted by Ballard, while it may be freely translated "an interval"—a localism in some parts of the United States and British provinces specifically for a low, level tract of land, a meadow between a river and upland, between hills, etc.—does not literally refer to "a clearing," but actually to a "place between" or "in the middle." The same elements, the *t* and *s*, being alternating letters or sounds, are found as components of place-names in varying forms throughout the whole Algonquian area—such as *Nashua*, *Ashawah*, etc. It also appears in the name of Eliot's fifth praying-town "*Nashope*" or "*Nashobah*," of which further mention will be made; hence any etymology founded on this word, as illustrated by Mr Downs, must be necessarily erroneous as far as Natick is concerned.

In the second place, the supposed identity of the Rhode Island *Natick* with that of John Eliot's *Natick* must be eliminated from the question, for the reason that the two were not originally of the same origin and derivation. Since Dr Trumbull "expressed a desire to see the Indian records of the town of Natick. R. I.," an early notation has been brought to light and published. It is displayed on the "plat of the land comprised in the original purchase of the Providence Plantations," made about 1677,[1] in the form of *Na-cheek*, and in a "declaration" made same year, "a place called by ye Indians *Natick* or *Nachick*."[2] This indicates positively to students of the language that "*Na-cheek*" was nearer to the true native pronunciation than *Natick*—a notation, in this instance, probably copied colloquially from the sounds of the better known name for ease of utterance, for at that period John Eliot's *Natick* had acquired considerable celebrity throughout New England on account of his labors there.

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[1] "Nate" was probably misconstrued from "*Nĕtek8*, lieu de bois franc" (see Rasle's Dictionary, in Mem. Amer. Acad., vol I, pp. 386, 396), the main theme of which, as the succeeding word, *Neteg8ickĕ* (= Otchipwe, *Mitigwaki*, "forest") bears witness, connotes a "tree," and not "bare or clear."

The Narragansett *Na-cheek* or *Nachick* is the equivalent of the Massachusetts *Nashik* (Eliot, Jer. 49 : 32), "a corner," and was bestowed on Rhode Island soil because the locality was "a boundary place"—"a corner" where the lines met in some conveyance of land by the Indians to the whites, or else was "a corner" on some Indian path or trail.[3]

In discussing the true significance and etymology of the name *Natick* or *Natik*, the two variations as written and applied by Rev John Eliot to designate his most celebrated Indian praying-town, and as retained in the first form to the present day, one main factor regarding the problem has never been taken into consideration, that factor being found in the circumstance that the names of some of Eliot's praying-towns, so called, while they are in the main from the dialect with which he was familiar, are not framed in accordance with aboriginal ideas or their method of constructing place-names, but are appellatives made up from the native language or altered from an original name, as some are by Eliot himself, in order to indicate some religious expression or other sentiments connected with the early building of the towns. In this peculiarity, if we may so term it, he undoubtedly followed the example of the Hebrew patriarchs, as is exemplified in the nomenclature of their ancient cities—*Hebron*, for instance, which in the Hebrew signifies association or friendship.

In proof of this characteristic of Eliot, his first town, founded in 1646, in the township of Newton, near Roxbury, Mass., was purchased by a committee appointed by the general court of

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[1] See fac-simile, Rider's R. I. Hist. Tract, 2d series, No. 4, pp. 100, 101.

[2] Ibid., p. 86.

[3] Roger Williams remarks: "Obs.: It is admirable to see what paths their naked, hardened feet have made in the wildernesse in most stony and rockie places."

Massachusetts, "for y^e incouragmt of y^e Indians to live in an orderly way amongst us . . . & further, to set downe rules for their impre^s & enioying thereof."

This place was called *Nonantum* or *Noonatomen* by Eliot, which signifies in English "rejoicing." The word, according to Dr Trumbull, means literally "I rejoice" or "I am well minded." The form *Noonatomen* (or *Nonantomum*) is plural, "we rejoice."[1] Dr Trumbull, in his "Names in Connecticut," modifies this, but without much difference, as "*Nonantam, i. e.*, he blesses." It is well to observe that no Indian would have applied such a name to a locality, for the reason that their own names are invariably descriptive in one way or another of the place designated. *Nonantum* was afterward abandoned and *Natick* became the first praying-town in the list as handed down by Eliot in his letters.

The second town in order was *Ponkipog*, varied as *Pakeunit* or *Pakemit;* the third was *Hassunnimesut;* the fourth, *Okommakamesut;* the fifth, *Nashope* or *Nashobah*, was situated about twenty-five miles west-northwest of Boston. In this term we find the equivalent of the Penobscot *Nātuah* (= *Nashua*), as quoted by Ballard, signifying "in the middle." The sixth town was *Wamesut*, or *Pawtucket;* the seventh, *Panatucket*, "is the upper part of *Merimak*-Falls, so called because of the noise the water makes;" the ninth, *Quanatusset.* The names of these towns, with few exceptions, possibly, seem to be framed in accordance with Indian custom, but for our purpose, as they have not been critically analyzed, it is unnecessary to refer to them further.

The eighth town, *Magunkaquok*, or *Majunkaquog*, was situated at the remotest bounds of Natick. This town was a gathering together of some of the Nipmuk Indians, who left their own places and sit together in this place and have given up themselves to pray unto God.[1] Dr Trumbull[2] says: "*Magunkahquog, Makunkokoag, Magunkook* (Nip'm),—a tract of land of about 300 acres, principally in Hopkinton, Mass., which was granted by Massachusetts to be occupied by the praying Indians. Gookin (1674) writes the name of the Indian town *Magunkaquog*, and says that the signification of the name is 'a place of great trees.' This would be decisive were it not that Eliot, who could not be mistaken as to the meaning of the name of a town that he had a chief hand in planting, wrote, in 1669,[1] '*Magꝏonkkomuk*,' which means 'the place (or town) of the gift'—*i. e.*, 'granted place,' from *Magꝏonk*, 'gift,' and *komuk*, 'place.' Possibly this, the original name, had, when Gookin wrote, been changed by the Indians themselves to the more familiar and more easily pronounced *Magunkook*, 'place of the great tree,' or the plural *Magunkakook* (= *Mogkunkak-auke*), 'place of great trees.'"

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[1] Algonquian Bibliography, Pilling, p. 177.

[2] Names in Connecticut, pp. 18, 19.

Natick now presents itself for our consideration and analysis. In examining the materials of the structure of Algonquian place-names, in order to translate them it may be stated that when one is obliged to account for the insertion of a supposed superfluous letter by euphony, that translations so arrived at are generally incorrect and worthless. In the present case it is absolutely certain that as Eliot was the principal agent in the baptism of the town, he did not insert the *t* for euphonic reasons, but because it belonged there as a part of the primary root or stem by him employed. This Algonquian verbal root *nat* has the meaning of "searching," "seeking," "fetching," "going after something;" and not only is it constant in all dialects of the family, but it preserves its independent significance, however combined, as resolution of its synthesis by analysis plainly teaches.

In illustration of this constancy of form and significance in the Cree of the far northwest, Howse[2] gives us *Nátik*, "fetches he," *-ik*, being the terminal or inverse form of the third person singular, which,[3] while having the same spelling as one of Eliot's forms, *i. e.*, *Natik*, is not grammatically the same. Eastern Cree (Lacombe), *Nât* (Rac.), "*Aller quérir*, *chercher*, *aller après*," etc., Nipissing (Couq.), *Nat-*, *voy Nadj et naj;* "*aller quérir;*" Abnaki (Rasle's), *ne-nat-8'-h8bé*, "*Je cherche ā boire;*" Otchipwe (Baraga), *Nad-in*, "to fetch." In the Massachusetts (Eliot and Cotton) it is of frequent usage in many cluster-words, such as *Nat-ineah* (Gen. 37 : 16), "to search, to seek," *i. e.*, "to go after something by seeing, observing, or marking;" *Nat-au-wuhae* (Jer. 23 : 12), "their visitation," *i. e.*, "their seeking rest;" *Nat-au-wompu* (Gen. 22 : 13), "he looked," *i. e.*, "he searched round about." (Compare Delaware, *Nattawoapin*); Delaware (Brinton), *Nat-en*,

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[1] MS. Petition, in Library of N. Y. Hist. Society.

[2] Cree Grammar, pp. 52, 53.

[3] This grammatical form is frequently used by Eliot, as in Psalms 27: 5, ***nut-adtash-uk***, "me hides he;" ***nuk-quenashh-uk***, "me sets up he."

"to fetch;" "properly, to go after something" (Anthony). These illustrations could be extended to a much greater degree from all the foregoing[1] and other cognate dialects. Enough, however, are displayed in their synthesis to indicate beyond a shadow of doubt the primary significance of the verbal root *nat*, as well as to prove that it is the main theme of Eliot's *Natick*, which, with its locative case ending *-ick*, signifies "the place of search" or "the place of (our) search."[2] In most remarkable confirmation of this interpretation, Eliot, in a letter written in the summer of 1650, the year of the planting of the town, relates the progress of his mission and their difficulties in seeking for a suitable town site in the following words: "But I declared unto them how necessary it was that they should first be civilized by being brought from their scattered and wild course of life into civill Cohabitation and Government . . . and therefore I propounded unto them, *that they should look out some place to begin a towne* into which they might resort, and there dwell together, enjoy Government and be made ready and prepared to be a People among whom the Lord might delight to dwell and Rule. . . . We accordingly attended thereunto *to search for a fit place*, and finally after sundry journeyes and travells to severall places, *the Lord did by his speciall providence and answer of prayers, pitch us upon the place where we are at Natick*."[3]

Surely nothing but an actual translation of the name by Eliot himself could be any stronger than these words of his which, after nearly two and one-half centuries of time, come forward to corroborate this linguistic study.

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[1] Compare especially the various compounds given under *Nät* in Lexique Langue des Cris, Lacombe.

[2] There is another curious relation in connection with this subject, if a suggestion may be permitted, although it may be in error, but as far as our studies have progressed it is not, is that *-atin*, *-adin*, *-adn*, or *-atin*, as it is dialectically varied, and which in composition signifies "a hill or mountain," may be possibly a derivative from the same root, so derived perhaps because "a hill or mountain" was "a place to seek for something from;" hence "a place of observation." If this suggestion is worthy of thought, it becomes evident that Deacon Ephraim could see "a hill" in the name, but owing to his lack of knowledge of the primary significance of the root, he did not comprehend the true inwardness of the term as used by his forefathers, and as Dr Perry remarks in the work before quoted, "He spoke according to the light that was in him."

[3] Algonquian Bibliography, Pilling, p. 178.

MESSAGE-STICKS USED BY THE ABORIGINES OF AUSTRALIA

R. H. MATHEWS

Message-sticks or, as they are sometimes called, "talking-sticks" or "black fellows' letters," have occasionally been referred to by writers on the customs of the Australian aborigines, but comparatively little information has yet been recorded on this subject. From inquiries I have made personally and through numerous correspondents in different parts of Australia, I am forced to the conclusion that the value of "stick-letters" as a means of conveying information from one tribe to another at a distance has been considerably overrated and misunderstood. To the student of ethnology, however, they are highly interesting as showing an attempt by a primitive and uncultivated people to develop some method of communicating their thoughts to persons at another place by means of symbols. Speaking generally, the stick is given to the messenger to assist him in remembering the heads of the message by connecting them with certain pictures, marks, or notches cut upon it, which are explained to him before he sets out on his journey. The stick also serves as his credentials, being a confirmation or guarantee of the genuineness of the message.

These message-sticks are pieces of wood of different sizes, varying in length from an inch and a half to eighteen inches or more. They are in some cases flat pieces of wood, ornamented more or less by carving, and were often painted a bright color; in other instances they are merely a rounded piece of wood or rod cut from the branch of a tree or sapling; while a still more primitive kind are made of a piece of bark. Instances have been observed where marked pieces of bone were used in a similar manner. They are marked in various ways, consisting of notches, dots, strokes, curves, and also with triangular, quadrilateral, and zigzag devices. In some of the more elaborately carved there are rude representations of human beings, while in some tribes they are not marked at all, but consist of a plain piece of wood. "Stick-letters" summoning festive gatherings are sometimes decorated with the down of birds, with or without other marks. In some tribes the wood used for making the stick must be of the same class[1] as the sender of the message, and the messenger who carries it must also belong to that class. Many of the devices on these sticks are apparently for ornamentation only, and would depend upon the artistic skill of the maker. The marks are made with a piece of sharp stone, bone, or broken shell. Plate VII shows a number of message-sticks used by the natives of the following rivers in New South Wales and Queensland: Culgoa, Narran, Cudnappa, Bokhara, Cuttaburra, Birie, Mungalalah, Clark, and Basalt. (See "description of plate VII" at the end of this article.)

"Talking sticks" appear to have been made according to some conventional design known among the tribes using them. One kind of stick is used for a corroboree where a large number of people assemble; another is used to convey messages or reminders between friends residing at some distance from each other; a certain sort of stick would be used for festive gatherings; another in cases of sickness or death, and so on. These sticks, differing perhaps but little in general appearance, would nevertheless be recognized by the people inhabiting the tract of country in which they were used, and would thus to a certain extent have a more or less fixed significance, which would, however, be very much restricted and of little use unless accompanied by a verbal explanation by the bearer.

Message-sticks are used in summoning an assemblage for hostile purposes, a meeting for corroboree, and in many cases of less importance. The messenger who carries the stick and the message is generally a young man, strong and active and a good traveler, who is, therefore, well qualified to satisfactorily discharge his duties. He is generally more or less known among, or is related to, the tribes he visits, and is to some extent acquainted with their dialect. On his arrival at the men's camp he hands the message-stick to the person to whom he has been directed to deliver it, giving the name of the sender and explaining the meaning. The party who receives the "stick-letter" carries it with him when he goes to the place to which he has been invited. Sticks conveying friendly messages or greetings would be carried by women or youths, as well as by the men. There being no urgency for the speedy delivery of these friendly messages, they are not generally sent direct, but may be a long time in reaching their destination. A messenger sent to a tribe to report the death of a relative or person with whom they were acquainted would have his face painted with pipe-clay.

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[1] See my papers on "The Kamilaroi Class System," Proc. Roy. Geog. Soc. Aust. (Q.), X, 18-34; "Australian Class Systems," American Anthropologist, IX, 411-416.

The bearer of a message is never molested by any of the tribes through whose country he may have occasion to travel while engaged on this duty, even although the people through whom he may pass are not on friendly terms with his tribe. As far as I can learn, this rule is of universal prevalence among native tribes throughout the continent, and a breach of it would lead to retaliation.

Mr F. G. Jackson, in his work "The Great Frozen Land" (1895)· says: "All the primitive tribes of northern Europe used wood, bone, and stone to write and cipher upon. Du Chaillu, in his 'Viking Age,' tells how the Norsemen wrote upon staves of whalebone, and how they tied hair to their letters of communication—just, strange to say, as the aboriginal Australians do today. I have seen some Australian talking-sticks with hair tied on the end of them, so that the recipient of the letter might the more easily know who sent it to him. The Australians, like the Norsemen, write also on bones as well as wood. A lady from whom I got some of my talking-sticks showed me a bone—the fibula of a kangaroo—with native characters on it."

The practice of using marked pieces of wood to accompany messages sent from one tribe to another may have been copied from some of the invading races who came to Australia in the remote past, and has been handed down in a rude form to the present time. The custom has been observed among the aborigines in different parts of Australia, but was much more highly developed in some districts than in others, and was, so far as I can learn, altogether unknown among some tribes. The latter statement should, however, be tested by further investigation.

Meetings for the performance of the initiation ceremonies are summoned by a messenger carrying a bull-roarer, the several articles of a man's dress, some native weapons, and occasionally a quartz crystal. A message-stick was also sometimes carried in addition to these emblems. As I have given very complete details of how these important messages are delivered in my papers describing the initiation ceremonies[1] of several native tribes, it is unnecessary for me to refer to them further in this paper.

Although the Australian "stick-letters" were not of themselves sufficient to convey any intelligible meaning, there appears to be some evidence that they were to a certain extent a rude kind of picture-writing, which would perhaps have developed into a more connected and useful form in course of time. It is well known that gesture language was more or less extensively recognized and understood among all Australian tribes. Gesture language may be called "idea-speaking," and pictographs "idea-writing." It has been said that written syllabaries and alphabets have been developed from pictographs, and it is suggested that in the picture-writing of different races the beginnings of our modern manuscripts and printed books are to be found.

It is hoped that some of the residents of those districts in which the custom still prevails will take advantage of their opportunities to accurately copy and fully describe as many as possible of these message-sticks, in order that additional light may be thrown upon a subject which is but little understood at present, and also, if possible, to enable a comparison to be made between Australian picture-writing and that of the peoples of other countries.

As bearing upon the subject of native drawings possessing a possible symbolical significance, I may refer the reader to several papers communicated by me to different scientific journals on the rock paintings and carvings[2] of the Australian blacks, and also on some remarkable drawings on the ground and on trees[3] executed by the same people.

The territory within which the message-sticks herein described were used is about 250 miles in length by a width of about 200 miles, and is distant about 600 miles from Sydney. It is situated partly in New South Wales and partly in Queensland, and is watered by the Narran, Culgoa, Warrego, and other rivers. I obtained the message-sticks and all the details respecting them from Mr James E. Miller, a police trooper stationed at Goodooga township. He has been traveling through that district in the discharge of his official duties for some years past and is well acquainted with the numerous aboriginal population, who still preserve their ancient customs. The information was not gathered by him all at once, but as opportunities offered during the last two or three years. After I had this paper drafted I sent it to Mr Miller and asked him to compare the descriptions of the message-sticks by a further reference to the natives who gave him the details. It was more than half a year before he had a chance of seeing all the men whom he had previously got the particulars from, and when he returned the draft to me no material alterations were found necessary. Mr Miller displayed great patience and industry in dealing with a difficult subject, and it is hoped others will follow his example.

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[1] "The Burbung of the Wiradthuri Tribes," Journ. Anthrop. Inst., London, xxv, 295–318; ibid., xxvi, 272–285. "The Bora of the Kamilaroi Tribes," Proc. Roy. Soc. Victoria, ix, n. s., 137–173. "The Bunan Ceremony of New South Wales," American Anthropologist, Washington, ix, 327–344. "The Keeparra Ceremony of Initiation," Journ. Anthrop. Inst., London, xxvi, 320–338, plate xxxii. "The Wandarral of the Richmond and Clarence Tribes," Proc. Roy. Soc. Victoria, X, n. s., art. iv, May, 1897.

[2] "The Rock Paintings and Carvings of the Australian Aborigines," Journ. Anthrop. Inst., London, xxv, 145–163, plates xiv, xv, xvi.

[3] "Australian Ground and Tree Drawings," American Anthropologist, ix, 33–49, one plate, figs. 1 to 36.

The use of message-sticks by the Australian aborigines as a means of communication between different tribes has been referred to by different writers on the customs of these people, but most of them are too fragmentary to be of any use to the scientific investigator. Among the most important of these the following names may be mentioned: In 1878, Mr R. B. Smyth published a work,[1] in which he describes three message-sticks, with illustrative drawings. Mr E. M. Curr, in 1886, gave drawings and descriptions of two message-sticks used by some tribes of which he treats.[2] In 1889, Mr A. W. Howitt described some of these sticks which he had received from different districts, to which he added a plate showing several figures.[3]

Description of Plate VII.

The message-sticks illustrated in this plate have all been reproduced by me from the originals, which are in my possession, and are accurately drawn to scale. The locality from which they have been obtained has been stated in each case, and their purport, as given by the aborigines, has been recorded as fully as practicable.

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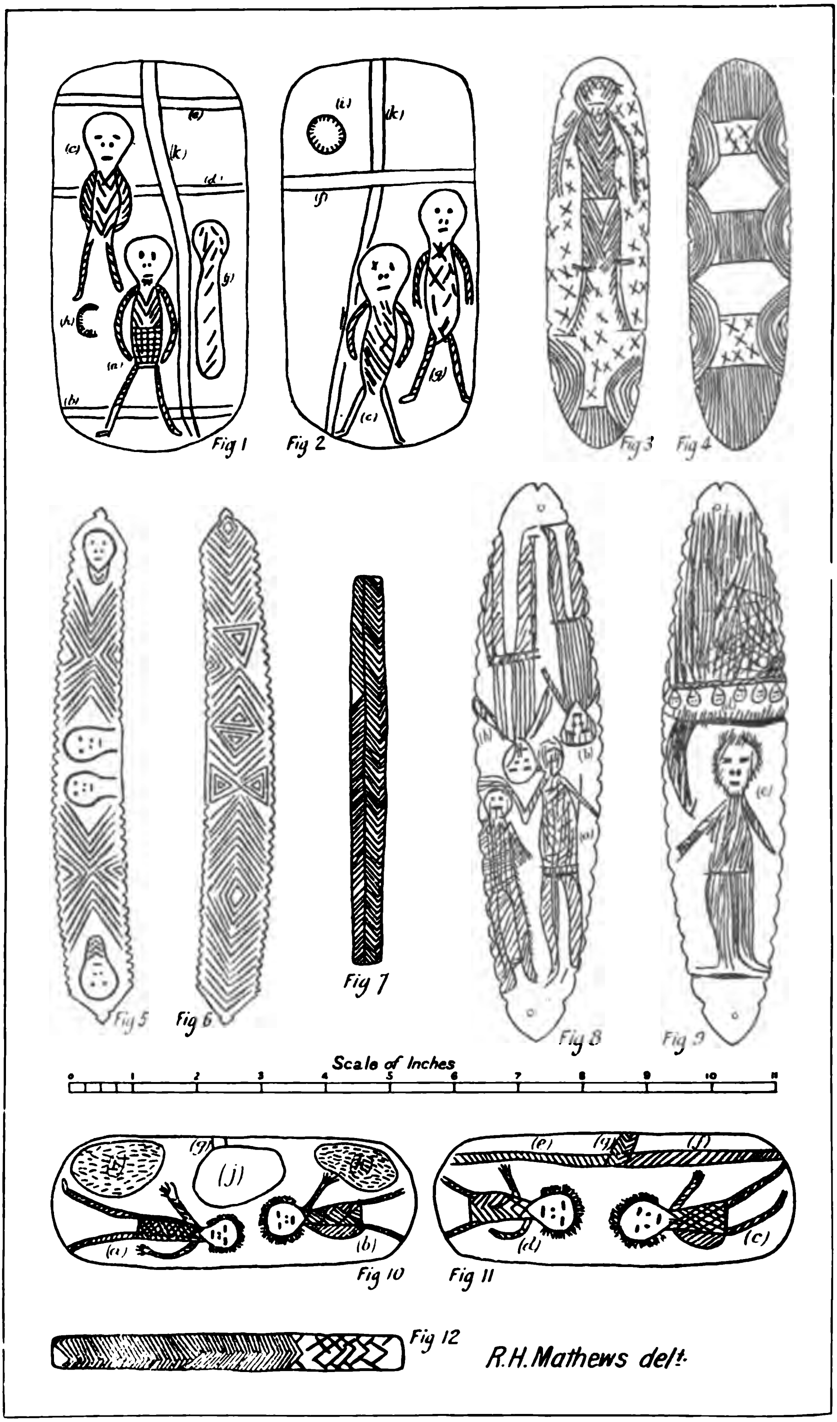
[1] The Aborigines of Victoria, I, 354–355.

[2] The Australian Race, I, 150.

[3] Journ. Anthrop. Inst., London, XVIII, 314–332.



AUSTRALIAN MESSAGE-STICKS

Figures 1 and 2.—The message-stick here represented is made of the wood of the cuttibundi tree, known to white men as quinine or Peruvian bark. Its length is six inches and an eighth, its breadth a little over three inches, and its thickness slightly exceeding three-eighths of an inch.

This is a message from Nanee, Kumbo Kangaroo, a head-man of the Culgoa tribe, to Belay, Kubbi Iguana, one of the head-men of the Tinanburra tribe. Nanee handed the stick to a black fellow named Imball, Kubbi Iguana, at Goodooga, on the Bokhara river, New South Wales, who conveyed it to Belay at Tinanburra, on the Cuttaburra river, Queensland, the distance between the two places being about 100 miles. When handing the stick to Belay, Imball told him that Nanee and his tribe wished to meet him (Belay) and his tribe on the Cudnappa river for the purpose of holding a corroboree. Imball further explained to Belay the devices on the stick as follows, which will be better understood by referring to plate VII: Nanee (*a*) sent the message from the Bokhara river (*b*), by the hand of Imball (*c*), via the Birie (*d*), the Culgoa (*e*), and Cudnappa (*f*) rivers, to Belay (*g*); that the stick was dispatched at new moon (*h*), and Belay and his tribe are expected to be at Cudnappa river (*f*) at full moon (*i*); (*j*) represents a corroboree ground, and Belay understands from it that Nanee and his tribe are corroboreeing at the Bokhara river, which is their *taorai*, and, further, that on the meeting of the two tribes at full moon on the Cudnappa river a big corroboree will be held.

The messenger, Imball, is shown standing beside Belay, which conveys the meaning that he will remain with the latter until he and his tribe are ready to start for the place of meeting, and that he, the messenger, will accompany them thither. The route taken by Imball in going from Goodooga to Tinanburra is shown at (*k*). From Belay's knowledge of the distance from the Bokhara river to the place of meeting on the Cudnappa river, he would know that the Culgoa tribe would require to start for the Bokhara very soon after he received the message at Tinanburra. Nanee and his tribe would have to travel about 70 miles and Belay and his tribe about 30 miles to reach the place of meeting.

Figures 3 and 4.—This message-stick was sent from Goodooga, on the Bokhara river, by a black fellow named Kubbi Iguana to his friend Yarri, Murri Iguana, residing at Angledool, on the

Narran river, inviting the latter to bring his tribe to Goodooga to a corroboree which was shortly to take place. The two places mentioned are in New South Wales and are about 60 miles distant from each other.

The stick is six inches and one-eighth in length, one inch and one-eighth broad at the widest part, and five-sixteenths of an inch thick along the middle, tapering almost to an edge at the sides and ends. The front side, figure 3, has a rude drawing of a man, about four inches long, apparently decorated for the dance. At each side of and below the human figure are a number of crosses, 34 in all, and below these are some straight and curved lines. There are ten notches, five on each side, nearly opposite to each other. The native stated that the stripes on the human figure mean that it is "got up" or painted for the corroboree. On the other side of the stick, figure 4, there are two groups of crosses, one containing four, the other six, or ten in all, similar to those on the front side. The remainder of the carving on this side consists of a number of devices of the *yammunyamun* pattern, made up of straight lines and curves. The notches[1] and crosses on the stick are merely added for ornament. The wood of which it is made is nunumbeera.

Figures 5 and 6.—This stick was made by Belay and Kunganooay, two brothers, of the Kubbi class and Iguana totem, both of whom are chief men of the Tinanburra tribe, and was dispatched to Nanee, Kumbo Kangaroo, one of the head-men of the Culgoa tribe, residing at Goodooga. The makers of the stick gave it, together with a verbal message, to a black fellow whose name I did not learn, who brought it from Tinanburra to Toulby, a distance of about 60 miles, where he handed it over to Kubbi Iguana, a man of the Culgoa tribe. Kubbi brought it to Tatalla, on the Culgoa river, about ten miles from Toulby, where he met "George," a half-caste, a Kubbi Padamelon, who is a "tracker" attached to the Goodooga police station and who was then at Tatalla on official duty. Kubbi handed the stick to George, who brought it to Goodooga and gave it to Nanee, the man to whom it was sent, with the verbal message he had received from Kubbi. The message was to the effect that Belay and Kunganooay requested Nanee and his two brothers, Bindi and Bunjalah, to come to Tinanburra for the purpose of joining them in a big corroboree, which was shortly to be held there. Tinanburra is on the Cuttaburra river, in Queensland, and Goodooga is on the Bokhara river, in New South Wales, the distance between the two places being about 100 miles.

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[1] Having heard white men say that these notches indicate a certain number of blacks. I asked Mr J. E. Miller, the police officer at Goodooga, New South Wales, to make the fullest inquiries he could from the various tribes in his district. He writes: "As requested by you, I have made strict and careful inquiries in reference to the 'nicks' on the edges of the message-sticks, and as far as I can learn, they do not mean anything. All the blacks in this district say the 'nicks' have no meaning, but are merely put on the sticks to ornament them, or, to use their own words, 'to make them look pretty.'"

The two heads alongside of each other in the middle of the stick, figure 5, are the two brothers sending the message, and the single head at each end of the stick are the two brothers of Nanee, to whom the message was sent. There are 76 notches or nicks altogether, 42 of them being on one edge; on the other edge there are 18 notches, and then a smooth space of about an inch and a quarter, after which there are 16 more notches. These notches are added merely for ornamentation. The remaining marks on the flat surface, and also all the marks on the other side of the stick, figure 6, consisting of V-shaped lines, triangles, and quadrilaterals of the *yammunyamun*[1] pattern are for ornamental purposes only. Bunches of the white down of birds were fastened on the ends of the stick, being tied to it by means of string attached to the notched projections at each end. These decorations are not shown in my drawing.

This stick is eight inches and one-tenth in length, an inch and one-tenth across at the widest part, and a quarter of an inch thick. It is thicker in the middle than at the edges.

Figure 7.—This is a message stick or token sent by a man of the Clark River tribe to one of the blacks at the Basalt river, Queensland. The messenger who brought it said it was a reminder to the Bluff Downs natives to bring plenty of handkerchiefs and other fancy things when they next visited the first-mentioned tribe. The length of the stick is five inches and three-eighths and its diameter half an inch. It is simply a round piece of wood, without any paint upon it, marked all over in a somewhat similar manner to figure 12.

Figures 8 and 9.—This drawing represents both sides of a message-stick made at Coomburrah by a native named Taballah,

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[1] This is a Kamilaroi and Wiradjuri word used to designate certain devices cut upon the ground or upon trees. Journ. Anthrop. Inst., London, xxv, 302; 323.

Murri Iguana, one of the head-men of the Cudnappa River tribe, who handed it to a black fellow named Kunbitalah, Murri Iguana, one of the Culgoa River tribe, who was at Coomburrah visiting the blacks there. Kunbitalah conveyed the stick to Angledool, and delivered it, with the oral message, to Enutbeakah, Kubbi Iguana, one of the head-men of the Currawillinghi tribe. Coomburrah is about 80 miles from Angledool.

This stick is made of what the natives call nunumbeera wood and is painted red. Its length is 8 inches and three-quarters, its greatest breadth an inch and fifteen-sixteenths, and its thickness three-eighths of an inch. The holes in the ends are for the purpose of attaching feathers or hair, not shown in the drawing. The notches on its edges have no meaning, but are merely ornamental; (*a*) represents Taballah, and the figure immediately alongside represents his wife. The two figures (*b*) (*b*) on the other end of the stick represent two black fellows of the Cudnappa tribe. On the other side of the stick, figure 9, the figure (*c*) represents Enutbeakah, and the other figures (*d*) on the same side represent the blacks of the Currawillinghi tribe. On looking at the stick, assisted by the verbal message, Enutbeakah understood that Taballah was bringing his gin and two other blacks with him, and by the figures on the other side of the stick Enutbeakah saw that he was requested to bring the blacks of his tribe, the Currawillinghi, with him.

Kunbitalah conveyed the stick from Coomburrah to Angledool, but this was not absolutely necessary; he could have handed it over to another black fellow at Goodooga or elsewhere on the route, but if he had done so it would have been requisite to have given him also the verbal message to be delivered with it. Coomburrah is on the Mungalalah river, Queensland, portion of the *taurai* of the Cudnappa tribe; Angledool, on the Narran river, New South Wales, is portion of the *taurai* of the Currawillinghi tribe.

Figures 10 and 11.—These drawings represent both sides of a stick sent by Nanee (*a*), one of the head-men of the Culgoa tribe, to Boomee, Murri Opossum (*b*), one of the head-men of the Cuttaburra tribe. It was dispatched from Goodooga, on the Bokhara river, to Brewarra, on the Cuttaburra river, both places being in New South Wales. Kubbi (*c*), one of the head-men of the Culgoa tribe, carried it from Goodooga to Tatalla, on the Culgoa river, where he handed it over to Noondooayah, Murri Opossum (*d*), one of the Cuttaburra tribe, but not a head-man, who was then at Tatalla on a visit to the Culgoa tribe. Noondooayah then carried the stick from Tatalla to Brewarra and handed it to Boomee, with the following oral message: " Nanee asks Boomee to muster his tribe and bring them to Tatalla, on the Culgoa river, to hold a big corroboree." (*e*) is the road the Cuttaburra blacks will travel to Tatalla; (*f*) is the track the Culgoa blacks will use in going to the same place; (*g*) is the track to the corroboree ground; if the Cuttaburra tribe arrive at Tatalla after the Culgoa tribe, they will see by the footmarks of the latter where to turn off the road and will follow the tracks to the corroboree ground; (*h*) is the camp of the Cattaburra tribe, with Boomee standing beside it; (*i*) is the camp of the Culgoa tribe, alongside of which Nanee is standing, and (*j*) is the corroboree ground, with the track leading to it from the main road.

The stick is made of midjerie wood and is five inches and five-eighths long, two inches and one-sixteenth broad, and three-sixteenths of an inch thick. The human figures carved on this message-stick are better executed than the drawing on any of the other sticks illustrated in this plate. An attempt has been made to represent the hair; the fingers are drawn on both hands of the figure marked (*a*), and on one hand of each of the other human figures (*b*), (*c*), (*d*); the features are delineated in them all. The two larger dots in each face represent the eyes; the two smaller dots below them are intended for the nostrils, and below these again is a mark for the mouth.

Figure 12.—The message-stick here represented is a round piece of wood, a little over half an inch in diameter and six inches long, and is painted red. It was sent by one of the blacks on the Clark river, Queensland, to a black fellow known as " Billy," residing at Bluff Downs station, on the Basalt river, asking him and his people to come to the Ana Branch, as a big corroboree was coming off. The localities mentioned are in the North Kennedy district, Queensland.

I have shown the marking on one-third of the circumference, the remainder being marked in the same way. The markings consist of V-shaped or zigzag lines, cut with tolerable regularity and sameness throughout the whole length of the stick.

FORMATION OF A RACE POSSESSING IMMUNITY TO TUBERCULOSIS.—A memoir has recently been presented by MM. Dubonsquet-Labordarie and Duchesne to the Academy of Medicine at Paris concerning a group of families at Saint Ouen that appear for many generations to have been immune from tuberculosis. These families are 98 in number and compose 511 persons. Records since 1870 show that no cases of tuberculosis have occurred in them since that date, and old men state that they have never seen or heard of any cases of such lung troubles among them. They are farming people of excellent sanitary habits, and rarely or never mix either socially or by marriage with immigrants from other sections of the country. Their children are almost invariably nursed at the breast. The annual death-rate from tuberculosis in France is 3 per 1,000; in the army 11 per 1,000. The effect of heredity and of hygienic conditions is therefore strikingly shown in this selected group.

ARROW-POISON IN AFRICA.—An English review of chemistry and pharmacy states that the poison used by the Bushmen near the Kalahari desert is obtained by crushing an insect of the genus *Diamphidia.* The active principle was found to be a toxalbumin that acts on the red corpuscles of the blood, causing a dissolution of the hemoglobine. This results in symptoms of paralysis, followed by death. Boiling destroys the effect of the poison.

A COUNTRY WITHOUT DOMESTIC ANIMALS.—Such, according to a Russian journal, is Japan. As the Japanese eat no meat and drink no milk, they have no use for the cow. As they do not ride and use men as draft animals, they need no horses, mules, nor donkeys. There are many dogs in the country, but in a wild condition. They raise no sheep, goats, nor pigs, wool being replaced by silk in their manufactures. Hens, ducks, and pigeons are rarely seen, being usually kept only for foreign consumption. The bulls kept near Yedo are for ceremonial use only, being destined to drag the funeral car of the members of the family of the Mikado. It would be an interesting ethnological study to determine what effect this absence of animals has had upon the development and culture of this remarkable people, who show in all their art such an extraordinary sympathy with natural objects.

THE VERIFICATION OF A TRADITION

FREDERICK WEBB HODGE

Like other Indian tribes, the natives of the pueblo of Acoma, in western central New Mexico, have a legend of their genesis and migration. In so far as the creation is concerned, the story of course is nothing short of the mythic, since the origin of any aggregation of kindred in the prescriptorial stage of culture must necessarily be accounted for in the same manner as the origin of any natural phenomenon of which they have no direct knowledge. It also has been found that the parts of these traditions which recount the movements of a people from place to place and note the adoption of other peoples as a part of their tribal organization, the oral record deals with actual fact and has been passed from generation to generation with such fidelity that the now archaic expressions of the ancients are still repeated each time the story is authoritatively told. So carefully, indeed, are such traditions and rituals uttered that the slightest error in their repetition sometimes brings to an end an entire ceremony.

The writer has devoted considerable attention to the verification, by comparison with known occurrences, of those parts of the lore of southwestern tribes that relate to the historic period of that section, and has found that such legends have been preserved so faithfully that they coincide fully with events known to have transpired as remotely as three centuries ago. Therefore when we hear from native lips a story of ancestral deeds, apparently unprofaned by Caucasian contact and without an undercurrent of the marvelous, its integrity may usually be relied on.

The story of the fate of Katzímo is a part of the Acoma migration tradition which takes that people back untold ages to the mystic Shípapu whence every Indian came and whither his shade must some day return. The earlier part of the story is therefore largely mythic, for it deals with a time whereof the memory of man runneth not to the contrary. Then the successive occupancy and abandonment of one locality after another is told in elaborate detail until the present valley was reached and the lofty crest of Katzímo became the home of the ancients.

In this part of the legend there is nothing that savors of the mystic; it is a plain story of the probable, unaffected by the civilizing influences that have been hovering over their fortified home for more than three and a half centuries.

Katzímo was their abiding place, but how long ago no tongue can tell. We only know that the present Acoma was occupied when Coronado came, in 1540, with such an array of glittering splendor as this land had never before and has never since experienced. Five hundred, or just as likely a thousand, years may have passed since the falling away of a great rock mass that hitherto had given accessibility to the summit. Just such masses have fallen a thousand times since, some of them so recently that the elements have not had time to round their clean-cut edges.

The few inhabitants that remained in the village at the time of the catastrophe were cut off from their kindred in the fields below. In a short time their flesh became food for the ravens, and their bones remained to be bleached and powdered by a torrid sun and blown or washed away by wind or rain. Then the present Acoma was selected as a homesite, and there they lived when Coronado, and Espejo, and Oñate, and Vargas came, and there they live today—an honest, peace-loving, industrious community.

The legend of Katzímo was first noted and published[1] by Mr Charles F. Lummis, the well-known author, by whom it was communicated to Bandelier. In giving expression to his opinion Bandelier says: "Whatever may be true in this folk-tale about the rock of Katzim-a (as the Mesa Encantada is called by the Acomas), it is certain that its appearance and the amount of detritus accumulated around its base give some color to the legend."[2] It is not probable that Bandelier examined the talus closely or he would not have failed to observe the potsherds scattered over the summit. Knowing the mesa to be inaccessible by ordinary means, he doubtless viewed the cliff from the plain.

In 1895, accompanied by Mr James S. Judd, now of Middletown, Conn., I visited the pueblo of Acoma, where the Katzímo tradition was repeated to me. Proceeding to that interesting cliff, I found little difficulty in making my way over the talus and up the great cleft near the southwestern corner to within about 60 feet of the summit, and while descending found traces of the hand and foot holes that must have formed a part of the original trail. The talus, I observed, contained numerous fragments of pottery, unquestionably of ancient ware. Some of the sherds gathered were decorated in a vitreous glaze, a method of ornamentation now unknown to any of the Pueblo potters. While it was found impossible to reach the crest of the mesa save by artificial means, I was satisfied that a sufficient body of evidence existed in the cleft and at the base to prove the verity of the Katzímo tradition.

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[1] St. Nicholas, 1890. Since this reference was made, Mr. Lummis has informed me that he first published the tradition in 1885.

[2] Papers of the Archæological Institute of America, Am. ser., IV, Final Report, II, pp. 313–314, Cambridge, 1892.

In July last an attempt was made by a representative of a prominent educational institution (who evidently had no previous training in archeologic work) to determine the truth of the legend of the Enchanted Mesa. With the aid of a life-line fired from a Lyle gun, this explorer was drawn to the summit, where he spent part of an afternoon in an examination of the surface. Nothing was found to indicate that the crest had previously been inhabited or, indeed, even visited.

A few weeks after the expedition of the University explorer, having completed some archeologic work west of Acoma, I decided to make another visit to Katzímo and scale the cliff. Equipping myself with an extension ladder comprising six 6-foot sections, some 200 feet of rope, and a pole-pick, I procured the remainder of my outfit at Laguna, where I had the good fortune to enlist the services of Major George H. Pradt, of that place; Mr A. C. Vroman, of Pasadena, Cala.; Mr H. C. Hayt, of Chicago, and two Laguna Indians. The trip to Acoma was made on September 1st. The following day was spent at that pueblo in witnessing the Fiesta de San Estevan, and early in the morning of the 3d our party proceeded northeastward three miles across the valley to the Enchanted Mesa.

It is not necessary to enter into the details of the climb, which occupied a little more than two hours. Very little difficulty was experienced in reaching the summit by way of the cleft above mentioned, through which, according to the tradition, the trail formerly passed. The truth of the legend was fully borne out by the finding of a series of ancient holes pecked in the stone to receive the rungs of the rude trail-ladder.

After being on the summit a few moments a sherd of ancient pottery was found by Major Pradt, and during the succeeding twenty hours several more fragments of earthenware, two broken stone axes, a large flint arrowpoint, and a portion of a well-worn shell bracelet were also picked up on the surface. A rude stone monument, whose origin was undeterminable by the leader of the previous expedition, was readily found at the edge of the eastern cliff wall and proved beyond peradventure to be of artificial character. No foundation walls are now traceable, however; but since the more extensive talus heaps below are composed largely of earth, it is not improbable that the structures that formerly existed on the mesa were built of the "adobe balls" which formed the principal building material of the Rio Grande tribes when visited by Coronado in 1540. No water remains on the surface of the mesa save in a few eroded "pot-holes" in the sandstone; on the contrary, during each heavy rain, the water flows off in many cataracts, carrying much sand and stone with it. Only a few thin patches of soil now remain on the mesa top; much of it has been washed to the talus slopes during comparatively recent years, as the numerous dead trees on the bare rock floor now testify.

Altogether, there is abundant evidence that the Enchanted Mesa was inhabited at a remote period, and that the tradition to that effect is substantially true.

BANDELIER'S RESEARCHES IN PERU AND BOLIVIA

FREDERICK WEBB HODGE

It is well known, especially by those who have followed the interesting and fruitful studies by this indefatigable investigator of the ethnology and archeology of our southwest and northern Mexico, Mr Adolphe F. Bandelier, that soon after the termination of the work of the Hemenway expedition he proceeded to Peru for the purpose of conducting similar researches in that country. It was through the munificence of Mr Henry Villard, of New York city, that these investigations were initiated in 1892 and continued until early in 1894, when they passed under the auspices of the American Museum of Natural History and were extended into Bolivia.

As Mr Bandelier has already submitted to the Museum a memoir on the results of his observations on the Bolivian islands of Titicaca and Koati, any reference to the later work of this eminent scholar would only anticipate his own elaborate account, which it is hoped will soon be published. As so little is known of Mr Bandelier's operations under the patronage of Mr Villard, however, his fellow-Americans will doubtless be glad to have a brief sketch of his earlier operations in a field so rich in antiquities.

When Mr Bandelier arrived at Lima, in 1892, he at once observed, even in the immediate vicinity of that city, a wealth of archeological material. In the Rimac bottom he saw ruins in every direction, and on some of the valley slopes, as well as along the seashore, there also are numerous vestiges of former aboriginal habitations. It is found, however, that documentary information points to the fact that here, as well as elsewhere, the number of these ruins is an indication of successive and not of contemporaneous occupancy. At the time of the arrival of the Spaniards the most extensive ruins on the Peruvian coast were either completely or at least partially abandoned. This is clear in the case of the so-called Cajamarquilla (even the aboriginal name can no longer be traced), which site was not only deserted but even forgotten in the beginning of the sixteenth century. Irma (or, as it is now called, Pachacamac) was half in ruins in

1532, and Chan-chan, near Truxillo, probably the most extensive of all South American ruins, had dwindled on the arrival of Pizarro to a moderate village at a site called Mansiche, a mile away. The raids of the Incas which were repeated with such pertinacity on the coast tribes from the backbone of the Sierra, cutting off their water supply and impeding their agriculture, and (previously to the rather recent appearance of the Incas) constant warfare between the valley inhabitants had produced the inevitable effects of this disturbing condition—one tribe slaughtered the other and wrecked its abodes, and the once deserted villages were never reoccupied. The so-called depopulation of Peru, Bandelier has happily discovered, is a myth in a sense, for it did not occur *after* the so-called conquest or through that conquest itself.

Owing to the physical peculiarities of the western coast of South America, the districts of that region inhabited by sedentary Indians may be considered as fairly well defined by sandy deserts, which separate them from one another. Through some of these deserts wide trails, that may be called roads, were traced in course of time by lines of trade and barter, while similar trails also connected neighboring settlements. Thus, in Rimac valley, where the soil in frequently swampy, the lines of travel appear for distances elevated above the surface. The native wended his way over a long, narrow ribbon-like trail, similar to a terrace encased between adobe walls. The supposed " Inca roads " on the coast are in fact anterior to the time of the Incas. They were marked out by the tribes of the coast and kept up by frequent use. After the Incas had overpowered the coast people and partly annihilated them, they followed the lines of communication already established for the sake of their own convenience.

The stupendous population ascribed to the coast valleys in ancient times appears justified at first sight by the extent and character of the different settlements; but aside from the fact that these settlements were far from being contemporaneous, an examination and detailed survey of the ruins prove that they were very far from harboring the numbers of inhabitants which they have been usually believed to contain. Chan-chan, near Truxillo, has been credited with hundreds of thousands at least, while from the plan sent in by Bandelier to the American Museum, on which is noted every wall still visible, it may be seen at a glance that, even ascribing to the settlement the greatest possible expanse for courts and garden beds and allotting to each individual a minimum of space, Chan-chan could never have contained 50,000 people in all, while the population of Irma or Pachacamac was even less in proportion. Another fact which hitherto has been overlooked is that Chan-chan, for instance, includes cultivated lots and fields, and that the latter occupy by far the greater portion of the area covered by the ruins. It was the home not of a town or city population, but of the entire tribe, to which the name of Chimu has also been applied.

Adobe is the material generally used in the construction of the ancient edifices, although there is hardly an extensive ruin on the coast that does not contain walls of stone also. The work on such stone constructions is fair; the blocks of stone were broken, not cut, and are laid in adobe mortar. Aside from adobes proper, so-called *terrones* or *cajon* work is also met. The adobes are usually of larger size than those made today, and they contain traces of indigenous grass. The walls are frequently daubed over with clay, the plastering being painted in white, Indian red, and yellow ocher. Other tints may also have been used, but the excavations have not yet revealed them.

The adobe walls are usually of remarkable thickness. At Irma or Pachacamac the great wall barring access to the place from the north is twenty feet thick, and walls of eight, ten, and more feet in width are not uncommon. In that ruin, as well as in the remains of ancient Surco, near Chorrillos, the size of the rooms appears disproportionately small in relation to the thickness of the walls. The latter also taper at the top, and the thought has been suggested to Bandelier that they had no other roofs than perhaps a covering of mats. Such a shade would be perfectly sufficient in the climate of the coast, where rains are very rare, though not absolutely wanting, as is sometimes believed. Buildings of more than one story are seldom found and these always appear to be an exception to the general type.

Artificial platforms and mounds are very common; indeed where the ground is low and swampy they appear to be the rule. Furthermore, every ruin occurring on dry and solid soil that has been examined has several tall artificial mounds within its area; some of these show traces of smaller buildings on the summit or on the sides, while others are so far destroyed that it is no longer possible to determine whether they also bore edifices of some kind.

In Rimac valley and in those portions of the valley of Truxillo and of Chiçama where the artificial platform or platform-mound prevails as a type, an examination of its structure was frequently possible. Mr Henry Bruening, one of Bandelier's friends and collaborators (now returned to Germany), had several of these structures cut through to the core in accordance with Bandelier's suggestion, and the mass invariably proved, as had been noticed at the hacienda of Lince near Lima, and elsewhere, to consist of a network of adobe walls forming what appeared to be numerous chambers, but which in reality were densely packed with earth or gravel, according to the greater or less convenience of one or the other material. The bottoms are frequently gravelly, and the drift was gathered in order to render the soil more suitable for cultivation and afterward used for solidifying the bases on which the Indian reared his abode. Around the mass of adobe walls filled in with earth or clay, a plating, so to speak, of adobe of greater or lesser thickness was built, this plating being applied so as to form an inclined plane, thus giving the mound a tapering form toward the top. This mode of construction (which also explains the chambered mounds in Gila valley, Arizona, regarded as many-storied houses when first noticed), as well as the great thickness of the walls, doubtless owe their origin to the frequency and violence of earthquakes on the Peruvian coast.

In the very center of such mounds, when completely excavated or removed, features were observed that recall forcibly the New Mexican Indian custom of giving to each inanimate object its heart. In some instances round columns formed a kind of an interior niche; in others, a small chamber contained urns or jars with maize-meal. A remarkable and very significant feature was observed by the explorer in a partly ruined mound at Chan-chan. The core of this structure when opened showed two well preserved altars of adobe. In such interior apartments figurines of metal, clay, or wood are almost invariably found, and the materially valuable finds made in Peruvian ruins in earlier times came from the " heart " of one or the other of the artificial elevations described.

The size of some of these mounds is surprisingly great. In periphery possibly none of them equals the mound of Cholula, but several approach it very closely in height. The largest of these structures are the so-called Huaca del Sol, a gigantic pile of adobe-bricks near Moche, in Truxillo valley, and the colossal mounds near Tambo de Mora, in the valley of Chincha. The documentary information regarding the purpose of these edifices is yet too fragmentary to afford much information. Many artefacts, human remains, etc, have been sent by Bandelier from these ruins to the American Museum of Natural History, where a portion of them are now on exhibition.

The aboriginal idioms of the coast, we are informed, have not completely disappeared. The Moch dialect or language is still occasionally heard in the vicinity of Truxillo, and the Indians of Eten, Ferreñafe, Monsefú, and even of Lambayeque preserve their original language, although they seldom use it in the presence of strangers. The Quichua, also formerly spoken, has almost entirely disappeared on the coast. Local names abound, both in the coast idioms and in the Quichua tongue, the latter being considerably modified through contact with the coast languages, as well as through the introduction of Spanish. Of ancient creeds and beliefs, the practice of witchcraft seems to be the only vestige. Sorcerers, practicing their art in the primitive method, are found chiefly in the northern coast pueblos, and they are not unfrequently sought from distant points in order to discover lost or stolen articles, or even for the purpose of healing and curing. Their performances recall those of the medicine-men of northern tribes in general.

Flattening of the occiput seems to have been a common custom among the ancient inhabitants of Truxillo valley. All the crania recovered by Bandelier in that locality show that peculiarity. Unfortunately, the collection of crania made at Chan-chan was lost while deposited for safe-keeping with the departmental authorities of Libertad.

After successively exploring the ruins of the Lince, of Surco and Magdalena in Rimac valley, of Irma or Pachacamac in the vale of Lurin, of Ronceros and Cerro de Tiza in the neighborhood of Pisco, of the levels about the upper course of Pisco river, the admirably preserved buildings of Tambo Colorado and the ruins of Humay still higher up; and after making, finally, a complete survey of the ruins of Chan-chan, it was determined to reconnoiter the upper course of Marañon river on the eastern slope of the Cordillera in the Peruvian north, whence the reports about the ruins at Kue-lap had created great interest.

The journey to these rugged and little visited districts carried the explorer through the historically celebrated town of Cajamarca. Very few vestiges of the former village of that name now remain, but Bandelier has noted that the extent of the pueblo may still approximately be traced, and that it does not bear favorable comparison in point of size with the present town of 12,000 inhabitants. Of architectural remains, the so-called house of Atahualpa is the best known specimen. The lower part of the walls of this quite small building show the peculiar type characteristic of the ruins at Cacha, Cuzco, and in the Inca region proper. The blocks forming the walls are irregular in form, sometimes trapezoidal and with reëntering angles, the surface slightly salient above the edges, and most neatly fitted through careful atrition, so that there was no need of binding material. An adobe structure with a gable, on the Cerro de Santa Apolonia, is also ascribed to the period antedating the conquest, as well as a stone "seat" near by.

The gable roof alluded to is characteristic of the ruins in the Sierra and even in the *quebradas* leading directly up from the coast. The ruins in these narrow and picturesque gorges are not very numerous, and form but very small groups. On the high crests, as at Chuqui-Manga, for instance, and at elevations that seem at first sight to approach the snow-line (while in reality they are yet far below), more entensive ruins are found.

As the season was too far advanced to permit an investigation of the region of Cajamarca and Cajatambo, Bandelier was forced to hasten toward the Amazon in order to reach Chachapoyas before the torrential rains commenced. It so happened, however, that the rains began much earlier than usual and with uncommon force; still he crossed the Marañon at Balsas, reached Chachapoyas, and thence went to Kue-lap.

The department of Amazonas, of which Chachapoyas is the capital, Bandelier regards as perhaps the most broken and accidented country that he has ever seen, the highest regions of the Bolivian cordillera excepted. While not a single height east of the Marañon reaches the snow-line, traveling there is almost an uninterrupted clambering up and down, and the valleys are so narrow that they might more appropriately be called gorges. In the bottoms sugar, plantains, even coffee, may be cultivated, while tropical forests with ferns of gigantic size are not uncommon. But as the eye sweeps upward along the steep slopes, it successively glances over all the zones of vegetation to the coldest crests of the Jalca or Puna, where only potatoes can successfully be grown, and even higher to the grassy and chilly levels, yet decked with diminutive flowers, of the culminating ridges.

The ruins lie mostly on the steep slopes and higher ridges, and even at an altitude of 9,000 feet and more they are buried beneath a mass of thorny shrubbery, shaded by tall trees. Kue-lap is almost unexplorable, so densely is it covered with forbidding vegetation, while even these difficulties were increased through the numerous thunder-showers that interrupted work at every step. Yet Bandelier succeeded in obtaining a complete plan, as well as a number of details, and in making some excavations. The result has proven that the reports about Kue-lap, as well as the so-called plans and surveys heretofore made, are utterly erroneous, and therefore that the conceptions of size and type of construction are correspondingly false. Kue-lap was a village of circular houses of stone, built without order in distribution on the level of a tall and rocky crest. This crest rises by tall steps, precipitous in many places, which makes Kue-lap perhaps one of the strongest natural points for defense which Indians ever selected for their abode. In order still further to increase their safety, the natural faces of these steps were plated, so to say, by fairly well constructed walls of stone, in places as high as fifty feet and about three feet in thickness. These walls have been described as artificial terraces of enormous thickness, but they are merely facings, made not exclusively for inaccessibility but more especially to guard against slides which the formidable rains of that section would inevitably produce. The houses are small and circular; rude decorations are sometimes found on the exterior. In many cases the natural rock forms the rear wall, as moisture and vegetation have wrecked everything of easy decay. Artefacts are not abundant, and only a small collection was secured. The crania are not deformed. The burials were found in the ground at the base of the great mural facings and also in niches opened in the facings themselves.

While in the department of Amazonas Bandelier succeeded in gathering a number of traditions relative to occurrences anterior even to the time when the Incas began to raid across the Marañon. The ultimate fate of Kue-lap is one of the subjects of these folk-tales. It is the old story of intertribal warfare, of constant harassing, unsuccessful attacks, and, finally, of a successful surprise of the impregnable site and the slaughter and dispersion of its people.

At present a dialect of the Quichua language is spoken in these regions, but there are a number of local names that cannot be etymologized by means of that idiom, not even by making the greatest allowance for corruption. Names like Kue-lap, Camdjian, Levanto, Lamud, etc, are not Quichua. Strange it is that one of the ruins between Chachapoyas and Kue-lap is called Aymará-bamba ("plain of the Aymarás"), and that the word Chachapoyas itself is etymologizable more easily and more plausibly through the Aymará than through the Quichua language.

After exploring as well as possible the ruins of Kue-lap, Shundur, Lirio, Aymará-bamba, Pucará, Macro, Cháuar, and visiting the Inca remains at Puma-cocha, rains and illness fairly drove the explorer back to Cajamarca. At Balsas, on the Marañon, he explored the ruins of Bambanej, as well as at two other points, thus obtaining data regarding the nature of the remains on the upper course of that river also. At Cajamarca the weather became worse, and only with difficulty and with disagreeable consequences to his health could Bandelier explore the artificial caves at the Ventanillas and Otuzco and the burials at Yerbabuena. As the rainy season had fully set in, there was nothing left him but to return to the coast to recuperate his utterly broken health. He reached Lima again on November 21, 1893.

Several months after Bandelier's return, the American Museum of Natural History of New York city took charge of the enterprise initiated so generously by Mr Villard. In the meantime the political horizon in Peru assumed a seriously threatening appearance; a general disturbance was imminent, and with such a danger ahead, any attempt at scientific work in that country would have been impossible. It was therefore necessary to look for a field of operations in a locality not immediately exposed to revolution or foreign warfare. Bolivia, whither he had intended to direct his steps in the beginning, was and has so far remained quiet and at peace with her neighbors, and although the field of research in Bolivia is much more difficult, as well as less "showy" than that in Peru, it was resolved to proceed thither. Unfortunately for the work, however, Bandelier's party did not escape even in Bolivia from the evil effects of the Peruvian civil commotion.

The explorations were directed first to Tiahuanaco, a preliminary reconnoissance of that site being conducted, and afterward some of the upper slopes of Illimani were investigated. Finally it was decided to settle on the island of Titicaca, where the Peruvian civil war kept Bandelier and his party blockaded for three months and a half, when they were compelled to flee from that island, owing to an uprising of the Indians on the Peruvian shores of the lake. Retiring under protection of Peruvian forces to Puno, he surveyed the ruins of Sillustani. Favored with the loan of a hand-wheel boat by friends at Puno, he returned to Titicaca, and from there went to Koati. With considerable difficulty, it became possible, through the assistance of the Bolivian authorities, to reach the mainland again at Chililaya, where a time was employed in excavation.

Returning to La Paz after an absence of nine months in the field, another journey was made to the slopes of Illimani in order to establish on its southern declivities the uppermost limit of sedentary occupancy in ancient times. In this Bandelier was successful, the limit having been found to be about 14,500 feet. In November, 1895, the party returned to Lima, where ten months were consumed in the preparation of maps, plans, and the monograph on the two islands previously alluded to.

In October, 1896, Bandelier again returned to La Paz, this time with the intention of remaining in Bolivia as long as possible. His first journey from this point was to the base of the great peak called Ka-ka-a-ka or Huayna Potosi, where, at an altitude of about 15,400 feet, he remained for two months, being most of the time blockaded by incessant snowfalls. His object was realized, nevertheless, for he satisfied himself that the tin which constitutes one of the elements of ancient bronze was not taken from that highly stanniferous region. From the Huayna Potosi, after having determined through several partial ascensions the limits of perpetual snow, Bandelier accepted the invitation of a friend to remain on the peninsula of Huata and investigate its ruins. Three months were devoted to this work, the weather in the meantime greatly impeding progress. At last accounts Bandelier was making preparations for a journey to Pelechuco, in the province of Caupolican, in the northwestern corner of Bolivia, where he hoped to spend the remaining half of the year.

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of the attention devoted to them. While admitting the arbitrary character of this mode of measurement, he held that the selection and the ordinal arrangement of the thousand persons found in this way would not be greatly changed by multiplying standards, even to the extent of weighing the opinions of all persons conversant with historical characters. The thousand most eminent (or most noted) persons selected in this way were then grouped by period, race, occupation, etc, the relations being shown graphically by means of a series of charts which offered an instructive view of human progress during the last two thousand years.

DEMONOMY

Estheology and Technology

As usual, the greater part of the communications presented at the two meetings were devoted to the simpler activities of mankind—*i. e.*, to the arts and industries—especially of primitive peoples, about half of the papers falling within this general category. One of the most comprehensive of these was that on "The Development of Form and Function in Implements," by Mr Frank Hamilton Cushing, presented synoptically at Detroit and repeated with illustrative experiments at Toronto. Beginning with the semi-arboreal progenitor indicated jointly by projecting forward the lines of biotic development and projecting backward the lines of human development, Mr Cushing undertook to trace hypothetically, yet by constant reference to known facts, (1) the genesis of artificial devices, and (2) the concurrent differentiation of the human brain and body in the directions set forth by Sir William Turner; and he gave special force to his exposition by frequent reference to commonly neglected characteristics, physical and psychic, of young infants. He pointed out that the prototype of man, whether infantile or primitive, is a clumsy ambidexter, the differentiation of hand and brain remaining inchoate; that one of the earliest artificial processes is a sawing movement, in which, however, the object to be severed is moved over the cutting edge or surface, and that the infant or savage at first selects sharp objects (teeth, shells, etc.) as cutting implements, and only after long cultivation learns to make cutting implements of stone; this early stage in development he called *prelithic*. Passing, then, to the age of stone, he showed that this substance is first used in the form of natural pebbles or other pieces for hammering, crushing, bruising, and as a missile; that in time the user learns that the stone is made more effective for severing tissues by fracturing it in such way as to give a sharp edge, the fracture being originally accidental and afterward designed; yet that for a long time it is the hammerstone that is fractured and not the object against which the blows are directed. In this stage of development (called *protolithic* after McGee[1]) stone implements come into more or less extended use in connection with implements of shell, tooth, etc; yet the implements are obtained by choice among natural pieces and by undesigned improvement of these through use. The next stage is that of designed shaping through fracture by blows from a hammerstone, followed by intentional chipping; this may be regarded as the beginning of paleolithic art, and also marks the beginning of dexterity and the activital differentiation of the hands. Incidentally the author brought out the importance of that concept of mysticism which is found of so great potency among infantile and primitive minds, in such manner as to suggest the genesis, and the obscure reasons for the persistence, of this phase of intellectuality; for the inchoate imagination is able to expand only in the direction of mystical explanation, so that fertility in primitive invention seems to be dependent on appeal to the mysterious powers of nature. At first the mystery pervades all things, but in time it is largely concentrated in animate things; then animate powers are imputed, *e. g.*, to physical phenomena. So to the infant or race-child fire is a mystical animal or demon which, in prelithic or protolithic times, must have been at first tolerated, then fed with fuel and punished with water, and eventually subjugated and tamed, much as the real animals were afterward brought into domestication. The entire communication abounded in originality; the critically observed facts of half a lifetime were combined with signal ingenuity; and, although the communication was presented during the last hour at each meeting, it received marked attention.

Several papers embodied the results of observations on the arts of primitive peoples still living in various parts of the world. At Toronto, Professor Haddon illustrated the method of "Adze-making in the Andaman Islands" by means of a series of stereopticon pictures, showing every stage in the operation from the selection of the tree in the forest to furnish the handle up to the final processes of attaching and grinding the stone blade; Sir William Turner exhibited a number of beautiful lance-heads chipped from glass in imitation of implements made from natural rock by the aborigines of northwestern Australia; Reverend J. Maclean, under the title "Blackfoot Womanhood," described the domestic industries and arts among the Blackfoot Indians of Canada, touching on the social status of woman in the tribe, and incidentally noting traces of a "woman's language" and bringing out some features of Blackfoot mythology; and Sir George Robertson ("the hero of Chitral") gave a vivid account of "The Kafirs and Kafiristan," illustrated by stereopticon pictures, showing implements, remarkable bridges, tombs with sculptured effigies, wall decorations, domestic occupations, etc. Coming still nearer home, Professor Haddon discussed the "Evolution of the Cart and Irish Car," illustrating by lantern pictures the various stages in the development of these vehicles, and in the ensuing discussion the observations of several members on primitive forms of vehicle in various parts of the world were brought out.

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[1] American Anthropologist, vol. IX, 1896, p. 318.

The descriptions of handiwork at Detroit pertained chiefly to the remote in time as well as in place; Professor William H. Holmes sketched "The Building of a Zapotec City" by describing the various processes in the construction of an ordinary house in the ancient city of Mitla, beginning with the quarrying and cutting of the stone with stone tools and ending with the roofing and surface embellishment, examples of the various materials and implements being exhibited; Professor Putnam described briefly the "Recent Researches by George Byron Gordon on the Banks of Ulloa River in Honduras for the Peabody Museum;" and Dr Saville discussed "The Geographic Distribution of a Certain Kind of Pottery in Mexico and Central America," which has a peculiar finish, approaching a true glaze, and appears to have been dispersed widely from a single original center about Alta Vera Paz, Guatemala. Related to these were two instructive papers by Harlan I. Smith on "The Ethnologic Arrangement of Archeologic Material" and "Popular Anthropology in Museums." Prehistoric arts and industries received attention also at Toronto; one of the most noteworthy addresses was an illustrated description of "The Lake Village of Glastonbury and its Place Among the Lake Dwellings of Europe," by Dr Munro, the well-known student of palafittes and the explorer of this village; special prominence was given to implements and to decorative articles connected with apparel, the former especially representing the transition from the stone age to the age of metal. This paper was followed by a report on the excavations at Silchester, in which the artifacts exhumed from the site of a Roman city at this place were briefly noted.

A special phase in the development of handicraft and associated motive was brought out at Toronto in a communication on "Prehistoric Trephining in Peru," by W J McGee, which was illustrated by the Muñiz collection of nineteen trephined crania. It was shown that the operation was performed by means of stone implements; that certainly in about a quarter of the cases, and presumptively in all, the operations were designed to relieve traumatic or other lesions, and that about half of the subjects survived; yet good reason was given for holding that the operators were ignorant of physiology and etiology. In discussing the methods and motives of the operators, the genesis and development of surgery were seriated in stages and substages as follows:[1]

Method		*Motive*	
Specialized	Refined	Therapeutic	Scientific
	Rude		Empiric
Primitive	Neoteric	Thaumaturgic	Sortilegic
	Archaic		Vicarious

The first substage is represented by the abandonment of head-taking for the taking of pieces of the skulls of slain enemies as amulets, and later by general post-mortem trephining, all for the (supposed) benefit of the operator; the second substage—which is partly hypothetic—is represented by operation on captives or malefactors, and later on members of the family or tribe, as a sort of ordeal; while the third and fourth substages are represented in the procedure of civilized countries. Incidentally it was held that the origin and growth of the art of trephining illumines the history of surgery and medicine; and it was pointed out that the Peruvian trephining represented in the collection pertains to the second substage in the development of motive.

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[1] Compare Sixteenth Annual Report, Bureau of American Ethnology, 1897, page 18.

A complement to this paper was presented at Detroit and repeated at Toronto under the title "A Case of Trephining in Northwestern Mexico," by Dr Carl Lumholtz and Dr Hrdlicka. This case of prehistoric surgery is especially significant as the first of the kind thus far known from the North American continent, and also in that the operation was much more skillful than the Peruvian examples, and may indeed have been performed by means of a tubular drill or other annular cutting instrument, comparable in design and function with the modern trephine.

A noteworthy communication at Detroit was an account of the surveys incorporated in "An Archeologic Map of Ohio," which was exhibited by, Warren K. Moorehead. The surveys were made under the direction of Professor Moorehead and the auspices of the Ohio State Archeological and Historical Society. The work has been continued three years; 3,304 monuments have been examined, located, and recorded on the map. The map received many encomiums from archeologists present, and the example of Ohio was commended to other states.

Perhaps the most noteworthy event connected with the Detroit meeting was the symposium on the antiquity of man in America as indicated by artifacts found in certain deposits in Delaware valley, The discussion began with two brief papers by H. B. Kümmel and G. N. Knapp, setting forth the general geographic and geologic conditions about Trenton and indicating the position of the " Lalor field,'' in which Mr Ernest Volk has for some years been making excavations under the direction of Professor F. W. Putnam and at the cost of various contributors, notably the Duc de Loubat. Professor Putnam followed with a full account of the work, illustrated by charts, photographs, and specimens. The excavations are carried down in a superficial deposit of sand to a depth of thirty to fifty inches; the section, which is somewhat variable, comprising (1) heterogeneous sand and loam (ploughed ground) about eight inches; (2) humus-stained sand and loam, more or less disturbed, about six inches; (3) more homogeneous sand, sometimes massive or structureless, sometimes containing irregular ferruginous bands, fifteen to twenty inches; (4) a variable layer of ferruginous clayey sand, sometimes absent but generally present, one to eight inches; (5) massive sand with occasional ferruginous bands and a few pebbles, six to twelve inches; (6) undoubted glacial gravels of considerable thickness (thirty or forty feet in the adjacent river bluff). By means of Mr Volk's records, supplemented by photographs, it was shown that artificially formed chips and spalls of argillite, quartz, quartzite, etc, and occasional perfect or broken implements are found at various depths in layers 3, 4, and 5 of this section. Describing these in detail, Professor Putnam distinguished three zones, the first comprising layers 1, 2, and the third comprising layers 4, 5; he gave emphasis to the circumstance that, in all of Volk's excavations, the artificial material found in the uppermost zone was predominantly of quartz and quartzite and of modern appearance, while that found in the second zone comprised chiefly large specimens of "turtle-back" type and that from the basal zone was almost exclusively of argillite and of paleolithic aspect; and he held that these differences indicate wide diversity in culture-grade and antiquity. He limited himself to the exposition of the associations brought to light through his researches, and left the discussion of the genesis and age of the deposits to the geologists. He was followed by Reverend Professor G. F. Wright, who held that the irregular ferruginous bands shown in the section were distinct layers of clay marking original stratification, and hence indicating (1) that the deposit was water-laid and (2) that it was of glacial age.

Professor Holmes then summarized the results of researches extending over several years, including a special investigation made in company with Professor Salisbury and Messrs Volk, Kümmel, Knapp, and Wilson a fortnight before the meeting. He first described the manufacture of stone implements among the Algonquian and other Indians occupying the region up to the beginning of the present century, and showed that their implements and the waste of manufacture corresponded precisely with the artificial material found in the Lalor field. Next he pointed out that the problem of the antiquity of man, as presented in Delaware valley, has been completely changed during the last decade. Ten years ago artificial material was reported to occur abundantly in the undoubted aqueo-glacial deposits known as the Trenton gravels; but his own researches and those of officers of the Bureau of American Ethnology, the experts of the State Geological Survey, and the geologists of the Federal Survey and other expert observers had failed to discover a single artifact in these deposits, and had sufficed to indicate the probable sources of error on the part of the early observers (who seem to have mistaken talus accumulations, naturally containing rejectage of Indian implement making, for undisturbed deposits). At present, on the other hand, the question, as stated by Professor Putnam, is limited to explaining the occurrence of artifacts in a local superficial deposit of less depth than that reached by the tree-roots, rodent-burrows, and ant-chambers of an ordinary woodland such as that covering the field in question until within a century. Proceeding then to describe the distribution of the artifacts, he remarked that his observations indicated (1) the midden refuse of a modern village occupying the Lalor terrace, and (2) the rejectage of an earlier occupancy by a people of similar culture-grade who made and lost implements of local material. He added that he and the expert geologists who were associated with him found the general distribution of artificial objects throughout the sand deposits to correspond with that of the vegetal humus, insect burrows, rootlets, fragments of coal and other recent materials, *i. e.*, most abundant toward the surface and gradually diminishing downward to completely disappear within four feet from the surface. Finally he pointed out that the differences of opinion expressed in the discussion were not those of observation, but of interpretation merely; while Professor Putnam would separate the plow-disturbed village relics from those of the sands beneath by a long period, and assign the latter to a distinct culture and race, he, reasoning from the character of the artifacts and from their associations, found such distinctions unnecessary, whatsoever the age of the sands; to him the art phenomena represent merely two phases of occupancy by the same Indian tribe, phases not distinguishable save that the one chanced to follow the other in a particular locality.

The discussion on the part of the geologists was opened by Professor Claypole, who, as Vice-President of the Section of Geology, aided in presiding; he confined his remarks chiefly to the ferruginous bands which had been thought to represent stratification, and showed that they cannot properly be so interpreted. He was followed by Professor Salisbury, the representative of the state and federal geologic surveys in the classification and mapping of the superficial deposits of New Jersey. After setting forth the genesis of the Trenton gravels, he showed that the local sand deposit containing the artificial material is distinct and of later—probably much later—origin. Taking up the structure of the sand in detail, he explained that, while the ferruginous layers present the appearance of clayiness in the section, this appearance is not borne out by physical analysis at the hands of experts, the examination proving that they are composed of sand intermixed with clayey particles in nearly the same proportion as that prevailing in other parts of the deposit; and he gave exhaustive reasons for holding that the ferruginous bands can by no means be regarded as representing stratification, and hence as indicating aqueous origin or Pleistocene age. He concurred with Professor Holmes as to the distribution of the artificial material in decreasing abundance downward, with little qualitative difference, and intimated that if the artifacts were diagnostic fossils (leitfossilen) geologists and paleontologists would not, in view of the possibility of accidental intrusion, regard them as worthy of serious consideration. He remained in doubt as to the origin and age of the sand, but was disposed to regard it as a wind deposit laid down long after the disappearance of the Pleistocene ice, perhaps within a few centuries. Formal communications followed from Messrs H. C. Mercer and Thomas Wilson; the former described the distribution of artifacts in the sand deposit in diminishing abundance downward, and noted the occurrence of insect cases and bits of anthracite coal (apparently modern) at depths approaching or equalling the lowest artifacts; the latter dwelt on the "paleolithic" aspect of some of the artifacts, especially those of argillite from the greater depths, his opinion, in this respect, coinciding with that of Professor Putnam.

In the general discussion then ensuing, Professor Dr Albrecht Penck, of Vienna, described a European instance in which a similar inquiry had arisen and had been set at rest by the discovery of Roman artifacts in the lowest layers; Dr Robert Munro pointed out that none of the material exhibited would be classed as paleolithic in English museums, and confessed to a rapidly growing skepticism, since his examination of the contents of different American museums, and especially of the material exhibited, as to the existence of a "paleolithic" era in America; Mr G. K. Gilbert, who was introduced as the Nestor among the geologists of the Federal Survey, pointed out that the large pebbles, sometimes mentioned as suggesting a Pleistocene age for the sand deposit, might easily have been transported in the same manner as the artifacts—*i. e.*, by human agency—and expressed doubt as to the validity of the supposed evidence of high human antiquity in Delaware valley; while Professor T. C. Chamberlin, of the University of Chicago, after indicating his familiarity with the deposits described, emphasized the questions (1) as to the geologic age of the sand deposit, and (2) as to whether the artifacts can be considered in situ, and proceeded to summarize geologic opinion to the effect that the case for glacial man in this locality is far from proved, even if it can be regarded as worthy of further discussion pending the discovery of definite evidence.

There were brief rejoinders from Professors Putnam, Holmes, and Salisbury; Professor Putnam reiterated his confidence in the evidence of an "argillite period" antedating the period of accumulation of miscellaneous artifacts found near the surface, and also mentioned extracting, with his own hands, an implement from directly beneath a bowlder in the Trenton gravels, and noted the finding of a human cranium, apparently in place, in the same aqueo-glacial deposits; Professor Holmes explained the futility of attempting to define an ancient "argillite period" in Delaware valley where the historical Algonquian Indians produced in large quantities just such argillite implements and rejectage as occur in the sand deposits; and both Holmes and Salisbury pointed out the probability that the implement found beneath the bowlder, and also the human cranium, were in the talus rather than in undisturbed deposits. In closing the session the presiding officer noted the significance of the fact that just as expert observers of the Delaware phenomena were multiplied, so the supposed evidence of high human antiquity melted away.

There were many expressions of satisfaction with the fullness and definiteness of the discussion, with the wealth of observation displayed by several speakers, and with the courtesy and good temper manifested by all; at the same time it was the prevailing expression that the question as to the existence of paleolithic or Pleistocene man in Delaware valley is practically decided in the negative, so far as the evidence thus far adduced is concerned.

In arranging the program for the Toronto meeting provision was made for a joint session of the sections of anthropology and geology to discuss "The First Traces of Man in the New World," and, while the plan for the joint session was carried out, the discussion was less extended than originally designed, largely by reason of the exhaustive review at Detroit. Sir William Turner, aided by Dr George Dawson (President of the Section of Geology), presided, and Professor Putnam was invited to open the symposium. He recounted the history of the work at Trenton, giving special attention to the excavations made under his direction by Mr Volk, and illustrating his descriptions by means of the charts, photographs, and specimens exhibited at Detroit. Under the title of "Human Relics in the Drift of Ohio," Professor Claypole followed with an account of the Masterman discovery announced at the Buffalo meeting of the American Association,[1] describing the geologic relations and discussing the form and partially decomposed condition of the specimen, a portion of which was exhibited.

President Sir John Evans opened the informal discussion. He declared emphatically that none of the specimens exhibited could be classed as paleolithic, and, after noting the coincidence between the geologic and anthropic records in Great Britain and on the Eurasian continent, called attention to the failure of such coincidence in America; he remarked that the Delaware Valley specimens, suggested to be of geologic antiquity, are just such as are found to be recent on the other side of the Atlantic, and that the Masterman ax, purporting to come from a geologic deposit of considerable antiquity, corresponds in no way with the paleolithic artifacts of appreciable geologic age in Europe; finally, he intimated that the weight of the supposed evidence of high human antiquity in America can best be settled by geologists, mentioning specifically Dr Dawson and Mr Gilbert. Dr Dawson, speaking on behalf of the geologists present, briefly expressed the conservatism with which these students have regarded the question of glacial man during recent years. He was followed by Dr J. W. Spencer, who described the geologic relations of Delaware valley, and estimated in years the ages of the deposits with which the archeologist has to deal. Speaking on behalf of those archeologists and geologists who had appeared at Detroit but were unable to be present at the Toronto meeting, McGee paid a tribute to the energy and persistence with which Professor Putnam had carried forward his researches at Trenton. Then, after mentioning his familiarity with the ground during several years of geologic and archeologic work in Delaware valley, he described the relations of the relic-bearing sands with the much older aqueo-glacial gravels as they had already been set forth at Detroit, noting that, while the latter were formerly supposed to yield artifacts, nothing of the sort has ever been found in them by the skilled archeologists of the Bureau of American Ethnology, the Philadelphia Academy of Natural Sciences, the United States Geological Survey, and the State Geological Survey. Referring especially to the distribution of artifacts in the sand, he explained that Professor Holmes and some others have discovered other materials than argillite in the lower part, and added that, even if argillite alone occurred, the fact would be of little weight, since the modern Algonquian Indians quarried and manufactured argillite extensively within a few miles of this locality up to the time of white settlement, and their implements, rejects, and chips correspond exactly with the material found in the sand. Remarking the unprecedented thoroughness of Professor Salisbury's survey of the deposits in question, he indicated the uncertainty as to the age of the sand bed and the probability that it is nothing more than a comparatively recent wind-blown accumulation, perhaps formed in a swamp like those now existing elsewhere in southern New Jersey. He added that the geologists most familiar with the facts regard the inquiry as hardly worth pursuing seriously until undoubtedly artificial material is produced from deposits known to be of geologic antiquity. Turning to the case adduced by Professor Claypole, he called attention to the fact that the discovery was not made by a scientific man, and was not placed on record until many years afterward; mentioning two comparable cases coming within his own experience which he had not deemed worthy of publication, he explained some of the principles of scientific evidence, and held that important conclusions cannot safely be based on isolated and hence unverifiable observations. Professors Putnam and Claypole rejoined briefly, and Sir William Turner closed the discussion with happy reference to the "Scotch verdict."[1]

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[1] *American Anthropologist*, vol. IX, 1896, p. 316. The instance is recorded fully and the specimen is well illustrated in the *American Geologist*, vol. XVIII, 1896, pp. 302–314, pl. XI, and discussed briefly (by Brinton) in *Science*, n. s., vol. V, 1897, p. 266. Now that this case has been before the scientific world so long that prejudice can hardly be produced by the statement of a conservative opinion in which others of equal competence might not coincide, the present writer feels impelled—though with much hesitation—to observe that ever since this specimen was first courteously placed in his hands by Professor Claypole at Buffalo, he has had doubts as to its artificiality. The first doubt grew out of the character of material, which could never have been so well adapted for use in implement-making as other rocks of the same region; the second grew out of the relative position of structural banding and the axis of the blade, which is not such as to suggest the judgment of experienced stone-workers, but does suggest chance wear through geologic action; and as other minor characters were examined, the feeling that the object is a natural pebble, perhaps slightly modified by heedless handling, took shape. The feeling was crystallized within an hour when a thoroughly competent anthropologist, of wide experience both in museums and among primitive peoples, remarked confidentially: "It is nothing but a pebble." These doubts are practically independent of the circumstances of the finding; they would exist if the object were submitted with no reference to special significance attached to it. The ax form is indeed so perfect as to challenge doubt—but not to remove it. The suggestion to the mind of the writer is that the object was probably found as an incipiently disintegrated and hence light and friable pebble in one of the older (Kansan?) drift-sheets, when its fortuitous resemblance to a stone ax led to its preservation; and that during the lapse of years children or others unwittingly increased the similitude by rubbing away the friable material, probably with the fingers (the stone is so far disintegrated that this may easily be done), especially about the groove. The decomposition lines seen in section and other features of the specimen were examined with this idea in mind, and were found to be not inconsistent with it. There is no reason to doubt the innocence of the (unscientific) finder in whose possession the object remained for a decade, at least so far as intent is concerned, or to question Professor Claypole's integrity or his interpretation of the geologic facts; but it seems necessary to just weighing of the evidence that this question as to the interpretation of the specimen itself should be placed on record.

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[1] The reporter on "Geology at the British Association" for *Nature* says (vol. 56, 1897, p. 486): "The final meeting of the section on Wednesday was devoted to a joint discussion with Section H on the first traces of man in North America, in which the President of the Association, Professors Putnam, McGee and Claypole, and Drs Dawson and Spencer took part. Though no definite conclusion was reached, the general feeling of the meeting seemed to be against the high antiquity of the reputed finds in the Trenton gravels." In the general report on "The British Association" in the same journal (p. 475) the characterization is as follows: "The work of these two sections appropriately culminated today in a joint discussion on 'The First Traces of Man in North America,' during which Professor Putnam gave an account of the supposed remains from the Trenton gravels. Professor Claypole spoke of the human relics from the drift of Ohio, and Sir John Evans criticised the evidence adversely, and showed the probability of error as to the occurrence of the specimens supposed to be from glacial deposits." The account of the reporter for Anthropology is longer but substantially similar in tenor; and of nearly the same tenor are the accounts of the reporters for the two meetings in *Science* (n. s., vol. VI, 1897, pp. 510–512 and p. 582). Referring especially to the Toronto meeting, though apparently summarizing the accounts of both, Professor Claypole, as reporter for the *American Geologist* (vol. xx, 1897, p. 202), says: "A somewhat guarded tone was observable during the discussion and both sides kept carefully within the lines of the evidence and the argument." In the *Journal of Geology* Professor Chamberlin writes editorially (vol. v, 1897, p. 638) of the Detroit symposium: "On the whole the discussion seemed to leave the general impression that the evidence of any very ancient or very primitive form of civilization at this locality is of a quite slender and doubtful nature. The hypothesis of a glacial man was scarcely in serious discussion although incidentally alluded to, there being no proof that the beds are of glacial age." And of the Toronto symposium: "The added point of interest there was the attitude of the British geologists and archeologists who are familiar with the character of the evidence in Europe where the antiquity of man is not seriously questioned. Their general disposition toward the evidence presented was that of marked conservatism. The foreign anthropologists and geologists seemed keenly alive to the inherent incongruities and self-destructive aspects of much of the supposed evidence for the great antiquity of man in America." These expressions have appeared since the paragraphs above were written.

Sociology

Sociology was subordinate in the anthropologic sections, being largely relegated to the social and economic section at Detroit and the section of economics and statistics at Toronto; yet the subject received incidental attention at the hands of anthropologists in both meetings, chiefly in connection with papers dealing also with other branches of demotic science. Especially noteworthy among these was Miss Fletcher's communication on "The Import of the Totem," made at Detroit and repeated at Toronto. After describing the origin of the personal totem through a puberty rite involving a trance or vision, she discussed the function of the totem in social organization. "The totem's simplest form of social action was in the Religious societies, whose structure was based upon the grouping together of men who had received similar visions. Those who had seen the Bear made up the Bear society; those to whom the Thunder or Water beings had come formed the Thunder or the Pebble society. The membership came from every kinship group in the tribe, blood relationship was ignored, the bond of union being a common right in a common vision. These brotherhoods gradually developed a classified membership with initiatory rites, rituals, and officials set apart to conduct the ceremonials." The function of the totem in the gens and in the tribe was next considered, and it was shown that its influence is great if not paramount in regulating the social structure. The communication, which represented the results of researches covering several years, was a model of condensation, yet extended over many pages; it will be printed in the proceedings of the Detroit meeting. As students of primitive institutions are aware, the idea of the totem is singularly complex and obscure; perhaps the best crystallization of the idea in the language of civilization is that jointly formulated by Miss Fletcher and Dr Boas, *i. e.*, the totem is the personal fetish grown hereditary.

Another significant contribution to knowledge of primitive institutions was made by Dr Boas in connection with the "Report of the Committee on the Northwestern Tribes of Canada," read by Secretary Myres in the absence of the principal author. The report itself is noteworthy as the twelfth in a series representing the results of extended researches made chiefly by Dr Boas under the auspices of the British Association; it dealt with the various characteristics of the Kwakiutl and Kutenai Indians, dwelling particularly on the singular institution called the potlatch. This is a feast or public ceremony characterized by the giving of presents so lavishly that the host may be impoverished; and ordinary observers, including governmental officials, have regarded it as improvident and highly injurious to the tribe. Guided by more extended research, Dr Boas shows that the potlatch is part of an elaborate and beneficent economic system analogous to the commercial systems of civilized peoples; its basis is credit extended by different members of the tribe to youthful or unfortunate householders in their time of need; while the potlatch ceremony is the public discharge of the obligations thus incurred. The ramifications of the system are various and almost interminable, as are the ramifications of any other economic system; and it is shown in the report that the unwitting interference with the system by white men has wrought great injury to the Indians.

Philology

While there were no special linguistic papers, several communications, particularly at Toronto, involved consideration of the arts of expression. Foremost among these was "The Kutenai of British Columbia and their Salishan Neighbors," by Dr A. F. Chamberlain, in which linguistic affinities were weighed, the author holding that the Kutenai language represents a distinct stock containing a few Salishan words; he discussed also the affinities between the peoples in their industries, myths, etc, giving special attention to the peculiar canoe of "monitor" or Amoor type. Another paper dealing prominently with language was by Mr C. Hill-Tout, entitled "Squaktktquacht, or the Benign-Faced, *Oannes* of the Ntlakapamuq, British Columbia"; it comprised a close version of one of the zoötheistic myths prevailing in northwestern America. Under the title "Kutenai Indian Drawings," Dr Chamberlain presented also a series of original sketches made by the Indians to represent various natural objects, men, animals, etc, and discussed the peculiar symbolism introduced by the primitive draftsmen; and, in the ensuing discussion, the similarity between some of these crude representations and those executed by early men in Europe was emphasized. Related to this communication was a brief paper by J. W. MacKay, entitled "A Rock Inscription in Great Central Lake, Vancouver Islands," comprising a description and photograph of a symbolic rock-carving of conventional character.

Sophiology

At both meetings that vestigeal philosophy commonly called folklore received much attention; and several communications were devoted primarily or incidentally to the exposition of primitive systems of opinion and belief, or to fiducial observances and ceremonies connected therewith. The first anthropologic paper presented at Detroit related to "The Superstitions, Beliefs, and Practices of the Ancient Mexicans;" it was transmitted by Madame Zelia Nuttall. The material was compiled from the records of early Spanish missionaries which have not been published hitherto. The observances described were connected with games and sports, agricultural and other industries, marriage, childbirth, and various other social matters, as well as aboriginal devotional exercises; and the paper abounded in significant details which at the same time supplement and find full interpretation in modern research. This was followed by a forcible appeal for further research concerning primitive beliefs and ceremonial observances presented by Dr Washington Matthews under the title "The Study of Ceremony." He emphasized the importance of the subject by illustrations taken from his own work among different Indian tribes, justly holding that primitive ceremony—the tangible expression of a dominant faith whose potency is beyond realization by civilized thinkers—is the controlling influence of nascent culture, molding character, shaping conduct, regulating social relation, and even determining form of expression. He suggested that the efforts of students might be concentrated and guided by recognizing the study of ceremony as a distinct science; and, after noting two or three provisional terms for denoting the branch of inquiry, he recommended that a committee be appointed by the Section to take such action in the premises as may seem needful. The communication was favorably discussed, and the recommendation with which it closed was adopted; and Stephen D. Peet, Alice C. Fletcher, and Frank Hamilton Cushing were appointed a committee to coöperate with Dr Matthews in defining the proposed branch of study, and, if in their opinion necessary, giving it a suitable designation.

In this connection may be noted a "Comparison of Cherokee and European Symbolism," by Dr Peet, in which he described certain striking coincidences in symbolic forms employed ceremonially, as well as in decoration, on opposite sides of the Atlantic. In this paper and in a more extended communication on "The Serpent Symbol in Nicaragua and Yucatan" (in which it was shown that the serpent was regarded as beneficent in these countries, while it was considered maleficent among the aborigines of the eastern part of the continent), he raised the interesting question as to whether the observed similarities in symbols are to be regarded as evidences of contact or merely as expressions of activital coincidence due to the tendency of the human mind in corresponding culture stages to respond similarly to like stimuli. The presentation and the ensuing discussion were noteworthy for the tolerance of opposing views and the tendency to balance justly and bring into harmony explanations commonly regarded as antagonistic if not mutually destructive.

Bridging the present and the past, Reverend R. J. Floody undertook to trace the "Origin of the Week and Holy Day among Primitive Peoples." Neglecting that prescriptorial mathematics under which 7, 13, and 7 × 7 become mystical numbers, he sought the source of hebdomadal time-measure in the phases of the moon; justly observing that primitive peoples discriminate the relatively light and the relatively dark in each lunation and thus define roughly a fortnightly period, he suggested that each of these is naturally divided into a seven-day period of wax and wane, and held that these quarter-moon intervals form a particularly convenient time-measure. Given the weekly period found in this way, the origin of the holy day is easily explained in accordance with the mental operations of men in all of the earlier grades of culture. The author fortified his explanation by abundant references to the customs of primitive peoples, and especially to early scholastic literature.

Several papers touched the present in time but the primitive in culture in dealing with philosophy and its expression. Easily foremost among these was Miss Fletcher's communication entitled "The Scalp-Lock: A Study of Omaha Ritual," with which the work of the Anthropologic Section at Toronto was introduced. Drawing on her rich fund of knowledge concerning the esoteric life of these Indians of the plains, she explained in eloquent measure and with contagious enthusiasm the marvelous imagery developed in the aboriginal mind through centuries of tradition, and portrayed forcibly the curious potency ascribed to form and symbol in the lower stages of culture; and the mystical significance attached to the scalp-lock and to the various operations by which it was shaped and preserved were set forth in full detail, with appropriate extracts from the attendant invocations and liturgies. The communication was freely and favorably discussed by Sir William Turner and by Messrs Hartland, Selous, and McGee. Two related papers were presented by R. N. Wilson, viz: "The Black-Foot Legend of Scar-Face" and "Black-Foot Sun Offerings;" the first of these was a typical Indian legend, with the customary mystical accompaniments, including appeal to a zoic sun-god; while from the second it appears that this legend had been invented, in accordance with the interesting law of the development of myth, to explain the system of sun-worship prevailing among the Indians of the northwestern plains. Stansbury Hagar followed with a suggestive account of the "Star-Lore of the Micmac Indians of Nova Scotia," with special reference to the sun, moon, and Pleiades. Of similar import was a noteworthy address "On the Hut-Burial of the American Aborigines," by E. Sidney Hartland, the leading British folklorist; this was an extended review of observations concerning the practice of burying within the lodge the dead body of its former owner. The reasons for this curious and apparently extravagant custom were sought, and the suggestion was offered that the observance is connected with beliefs growing out of the consanguineal organization characterizing the tribes among whom the custom has been found to prevail.

Coming down to the present in time, and representing the vestigeal and aberrant in cultural development, were two significant papers classed as folk-lore; the first of these, presented at Toronto, was "Some Old World Harvest Customs," by Mr F. T. Elworthy; the other, presented at Detroit, was entitled "Koreshanity—a Latter-day Cult," by Anita Newcomb McGee. The latter recounted the modern development of a theistic system, involving also a curious cosmogony, which has, within a few years, gained many hundreds of adherents, of whom one or two hundred have united in a communistic organization with headquarters near Chicago.

ETHNOLOGY

Several papers and reports, especially at Toronto, dealt primarily or subordinately with ethnic relations; and it is especially significant that, with one or two inconspicuous exceptions, the characters described and discussed were essentially demotic. In addition to the reports already mentioned, there were presented at Toronto a "Report on the North Dravidian and Kolarian Races of Central India;" a "Report of the Ethnographic Survey of Canada;" a "Report of the Ethnographic Survey of the United Kingdom;" and a "Report on the Necessity of the Immediate Investigation of the Anthropology of Oceanic Islands."

A communication received with close attention at Toronto was a brief account of "The Seri Indians of the Gulf of California," by W J McGee; the peculiar isolation, the militant disposition, and the distinctive arts of the tribe were described, their strongly matronymic organization and their protolithic stone-work receiving special attention; while the people were characterized as apparently more nearly autochthonous than any other group thus far studied. Of special interest, too, was a paper by Professor B. Sulte on the "Origin of the French Canadians," in which emphasis was given to the remarkable uniformity and purity of the French language spoken in Canada.

An extended descriptive paper, illustrated by admirable photographs, was presented at Detroit under two titles and repeated at Toronto, by Professor Dean C. Worcester; it related to the Tagbanua and Mangyan tribes of the Philippine islands. The pictorial representation of costumery, habitations, domestic arts, etc, and the descriptions of social customs constituted a valuable contribution to anthropology; and at both meetings Professor Worcester, who turned aside from another specialty to collect the material, was the recipient of much commendation.

A noteworthy feature of the Toronto meeting was a "Discussion of Evidences of American-Asiatic Contact." This was introduced by Professor Putnam with a communication on "The Jesup Expedition to the North Pacific." Beginning with an account of the expedition recently sent out through the munificence of Mr Morris K. Jesup, of New York, Professor Putnam enumerated some of the evidences of intercontinental contact which have long puzzled anthropologists, and which were instrumental in determining Mr Jesup's action; and the lines of inquiry which promise to throw light on the question of contact were described at length. The general discussion was opened by Professor Edward S. Morse, who adduced various indications of the independent cultural development of eastern Asia and western America. He emphasized the essential unity of the American race, both in physical characteristics and cultural features, and noted especially the absence from America of tea, silk, and other useful and easily transported Asiatic commodities. Mr Cushing followed, mentioning several examples of known activital coincidences which seem to be comparable with those similarities in decoration, games, etc, which have been supposed to indicate intercontinental contact, while Dr A. F. Chamberlain emphasized the unity of the American race, and dwelt on the absence of conclusive evidence of cultural contact. Professor Putnam and other speakers noted the significance of the discussion as indicating the need for just such researches as those endowed by Mr Jesup.

GENERAL

While several communications at both meetings were profound and some were broad in scope and treatment, the only contribution aiming to cover the entire domain of anthropology was the vice-presidential address at Detroit.[1] At the instance of the retiring Vice-President, Miss Fletcher, the first morning session of the Section after the presentation of this address was allotted to a summary of the address and a discussion of the classification set forth. Miss Fletcher, Dr Munro, Professor Myres, Dr Peet, Professor Witmer, and others expressed approval of the classification either in general or in special features; there were no adverse expressions.

Notably comprehensive in treatment, though measurably limited in scope, was the presidential address delivered at Toronto by Sir John Evans. Indicating the interest and importance of archeology as a branch of science, he reviewed the progress of knowledge concerning prehistoric races, and summarized the results of recent researches clearly and justly. Referring to supposed evidences of preglacial or Pliocene man in England, he repeated his verdict of 1890, "not proven;" mentioning supposed Pliocene or Miocene flints from Burma and the *Pithecanthropus erectus* from Java, he called attention to the inconclusiveness of the geologic determinations of antiquity; then passing to the paleolithic man of Britain, he pictured the conditions under which this human prototype lived and portrayed the geographic and climatal vicissitudes which have supervened since his advent—valleys have been excavated to depths of 100 to 150 feet, thick layers of stalagmite have been formed in caverns, the later episodes of the glacial period have run their course, and the fauna and flora of the British Isles have been largely revolutionized since men began chipping flints along the shores and interior waterways of England. In this region—unlike America—those implements known to be ancient from the geologic evidence are of distinctive type, while those known from associations to be newer are of another type, so that the classification of the prehistoric handiwork of the British Isles as paleolithic and neolithic expresses, at the same time, geologic relation and technologic interpretation. Passing thence to the Eurasian and African continents, he traced the probable courses of migration pursued by earlier men; and, seeking the best available data for time estimates, he suggested a date some 3,500 or 4,000 years before our era for the beginning of neolithic culture in Egypt. Referring especially to America, he observed, "It may be thought that my hypothesis does not do justice to what Sir Thomas Browne has so happily termed 'that great antiquity, America.' I am, however, not here immediately concerned with the important neolithic remains of all kinds with which this great continent abounds. I am now confining myself to the question of paleolithic man and his origin, and in considering it I am not unmindful of the Trenton implements, though I must content myself by saying that the 'turtle-back' form is essentially different from the majority of those on the wide dissemination of which I have been speculating, and, moreover, as many here present are aware, the circumstances of the finding of these American implements are still under careful discussion."[1] Finally, after paying a tribute to "the admirable Bureau of Ethnology, instituted by our neighbors in the United States of America," he made a forcible plea for the institution of an official ethnologic and archeologic survey of the entire Victorian dominion.

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[1] This volume, pp. 241–272.

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[1] These expressions are remarkable as a forecast of the conclusions reached in both meetings after full discussion of old and new evidence.

American anthropologists will be gratified by the election of one of their number to the presidency of the American Association, namely, Professor F. W. Putnam, the permanent secretary of the Association during half of its existence. Dr L. O. Howard, of Washington, was chosen to succeed to the permanent secretaryship. The officers-elect of the anthropologic section are: Vice-President, J. McKeen Cattell, professor of psychology in Columbia University and editor of *Science* and the *Psychological Review*; Secretary, Dr M. H. Saville, of the American Museum of Natural History.

The next annual meeting of the Association will be held at Boston; and provision has been made for holding a winter meeting of the Section of Anthropology during the Christmas holidays.

AUSTRALIAN CLASS SYSTEMS

R. H. MATHEWS

In an article under the above title published in the AMERICAN ANTHROPOLOGIST for December, 1896, volume IX, pages 411 to 416, I gave a short account of the class system of the Wiradjuri tribes, New South Wales.[1] The editor of that journal found it necessary, in order to provide space for my paper, to abridge it in certain particulars, and, among other matter, excised some details relating to the descent of the children. As these details form an essential part of the paper, without which it would be incomplete, I have again submitted them for publication. They fit into the original article between lines 34 and 35, on page 414, and should be read in conjunction with that article. The following is the matter which was excised.

An explanation of the rules regulating the descent of the children under the four class and totemic divisions will now be given, and in doing so the same sixteen totems mentioned in

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[1] See also my paper on the "Kamilaroi Class System of the Australian Aborigines," Proc. Roy. Geog. Soc. Aust. (Q.), x, 18–34.

Table A will again be adopted, so that throughout our examples we may be dealing with the same people. The totem names given in that table will be taken in the same order, so that a ready reference can be made to any number from 1 to 16. The peculiarity of a mother producing children having a different totemic nomenclature to her own has not, so far as I am aware, been observed by any previous investigator, and is now published for the first time.

No. 1, Matha Emu is the mother of Kubbitha Flying Squirrel.

No. 2, Matha Red Kangaroo is the mother of Kubbitha Bandicoot.

No. 3, Matha Brownsnake is the mother of Kubbitha Porcupine.

No. 4, Matha Ground Iguana is the mother of Kubbitha Native Bee.

The four little Kubbithas who are born in this way will grow up and become the mothers of another generation of Mathas, each little Matha having the same totem name as her mother's mother, as follows:

No. 5, Kubbitha Flying Squirrel is the mother of Matha Emu.

No. 6, Kubbitha Bandicoot is the mother of Matha Red Kangaroo.

No. 7, Kubbitha Porcupine is the mother of Matha Brownsnake.

No. 8, Kubbitha Native Bee is the mother of Matha Ground Iguana.

Taking now the totems belonging to the Ippatha and Butha pair of classes we find a similar result:

No. 9, Ippatha Mallee Hen is the mother of Butha Common Fly.

No. 10, Ippatha Opossum is the mother of Butha Goonhur.

No. 11, Ippatha Eaglehawk is the mother of Butha Gray Kangaroo.

No. 12, Ippatha Jew Lizard is the mother of Butha Codfish.

In the next generation the Buthas just referred to will become the mothers of other Ippathas having the same totems as those mentioned in Nos. 9 to 12, thus:

No. 13, Butha Common Fly is the mother of Ippatha Mallee Hen.

No. 14, Butha Goonhur is the mother of Ippatha Opossum.

No. 15, Butha Gray Kangaroo is the mother of Ippatha Eaglehawk.

No. 16, Butha Codfish is the mother of Ippatha Jew Lizard.

A careful perusal of the foregoing genealogy will show that among the tribes treated of in this paper any given totem is always the mother of a certain other totem.[1] For example, an Ippatha Eaglehawk, No. 11 in the above list, is invariably the mother of a Butha Gray Kangaroo. Of course, her sons will be Kumbo Gray Kangaroos, but I have omitted the names of the males, because they will be understood by the reader in each case. In the next generation the relationship is reversed, and Butha Gray Kangaroo, No. 15 in the genealogy, becomes the mother of Ippatha Eaglehawk.

I wish to make the following corrections in my paper on "Australian Class Systems," published in the AMERICAN ANTHROPOLOGIST, volume IX, page 413: In line 28, for "No. 10" *read* "No. 12;" in line 30, for "No. 11" *read* "No. 10;" and in line 32, for "No. 12" *read* "No. 11."

MR WARREN K. MOOREHEAD is preparing material for a large archeological map of the State of Ohio, recording by townships the character and location of prehistoric mounds, village sites, enclosures, etc., in coöperation with the Ohio State Archæological and Historic Society.

Mr Moorehead has been able to give a preliminary account of the work in his report of 1897, of which the following is a summary:

In the entire State there are (records up to January 30, 1897)—

Circles of the earth	143
Squares of the earth	74
Enclosures and fortifications of earth and stone	279
Series of groups of stone graves	115
Glacial kame or gravel-knoll burials	223
Village sites	174
Tumuli of earth and stone	1,835
Total	2,843

O. T. MASON.

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[1] Among the Kamilaroi tribes every totem reproduces itself; that is to say, the children of an Emu mother are always Emus. Proc. Roy. Geog. Soc. Aust. (Q.), vol. x, p. 22. But owing to the different course of descent which I have discovered among certain tribes of the Wiradjuri people, the Emu is the mother of the Flying Squirrel.

BOOK REVIEWS

Canadian Savage Folk—The Native Tribes of Canada. By John Maclean, M. A., Ph. D. (Illustrated). Toronto: William Briggs, 1897.

But little has been attempted in the way of systematizing the researches made among the native tribes of Canada, especially with reference to the relations these people sustain to their neighbors in the northern United States.

This seems to be the underlying thought of the author, as he gives an outline or census, as it were, of the surviving communities of the Indians of Canada.

While the subject-matter is presented from the standpoint of the missionary rather than of the scientist, still the author, as he himself states, attempts to reach the meaning of the life of the savage folk.

About one-third of the volume, or nearly 200 pages, is devoted to a recital of the present number, condition, location, and history of the remnants of the once powerful Siouan and Algonquian stocks. Their customs, church, and camp, native heroes, and religions, races and languages are treated in turn, and the last 100 pages are devoted to "Trail." With the various tribes noted is a short vocabulary illustrating the language of each.

J. H. McCormick, M. D.

Researches upon the Antiquity of Man in the Delaware Valley and the Eastern United States. By Henry C. Mercer. Vol. VI of the Series in Philology, Literature, and Archæology. Publications of the University of Pennsylvania.

This contains five papers by Henry C. Mercer. The first and most important is devoted to an inquiry as to the age of turtlebacks. After describing his own experiences among the grave specimens of this country and of Europe, the author sums up his conclusions as follows with reference to the vexed question of paleolithic man in New Jersey:

1. Three personal searches at the Pennsylvania Railroad ballast quarry at Trenton, the site of numerous discoveries, and where the stratified gravel was continually exposed by the workmen in fresh sections, failed to reveal a specimen in place.

2. Argillite "turtlebacks" resembling the Trenton blades were found associated with Indian refuse at Gallows Run, Hickory

Run, Lower Blacks Eddy, and other river village sites, and never at isolated spots or flaking places disassociated with Indian remains.

3. Indian quarries were discovered in the adjacent region at Durham, Saucon Creek, Macungie, and Vera Cruz, where Indians had mined jasper in comparatively modern times, and produced wasters, "turtlebacks," resembling in all but their material the argillite "turtlebacks" from Trenton and their duplicates from the surface river village sites.

4. As compared with Europe, the traces of man in the Delaware valley (if we except Trenton) were modern and scanty. The thin homogeneous deposits were all referable to the Indian as we know him.

5. The caves explored by the writer failed to give evidence of pre-Indian or geological ancient man, Durham cave having been injured by blasting, Hartmans cave having been excavated without a careful study of layers, Raubsville cave having lacked floor deposits, and the "Indian house," with its floor film of Indian refuse, having appeared of insignificant size.

Chapter second of this paper is, if possible, more interesting than the first, since it describes minutely the finding of an ancient argillite quarry at Gaddis Run and lower down the stream a blade workshop on the Delaware river. It is definitely shown by Mr Mercer's careful researches that in the quarry rude hammers were used, and similar operations of this at Piney branch were carried on. Only three pitted hammer stones were found in the quarry, and these were supposed to have been lost there by workmen from the blade shop lower down the stream. With reference to these two points Mr Mercer comes to the following conclusions:

a. That the "turtlebacks" (none of which show signs of use) cannot have been wanted by their makers, or they would not have been left to the extent of one to every bushel of chips. Some may have been lost (like two finished blades at the camp workshop to be described), but the great majority must have been "wasters" or "rejects" cast aside in the process of the work.

b. In their present state they are as much "finished" as the Trenton specimens. Therefore, if the latter are tools, the quarrymen were not making such tools at the quarry; for if they had been they would have wanted them, and if they had wanted them they would not have left them.

c. Not a single one of the thinned-down blades, so sparsely found at Piney branch, not a trace of one of the broad argillite cache blades, so common at the Delaware Indian sites, were met with in all the tons of refuse overturned (see figure 22).

d. Two of the "turtlebacks" were very much larger than alleged implements from the European drift or from Trenton.

e. That the presence of three pitted hammers associated the work with a Neolithic people rather than the alleged driftmen of Trenton.

f. That the mere presence of the "turtlebacks" again disconnected it with any people like the alleged driftmen, who, if they had made the blades, as finished implements would have wanted to use them, and so would not have left them.

g. That, though seeming to belong to a special class, the shape, position, and general appearance of the "turtlebacks" allied them with work known to have been done by modern Indians.

h. That the position of the quarries seemed to connect them with the Indian rather than any other race, lying as they do on what might be called a pathway littered with Indian blade material, leading directly from the ancient mines to an Indian village only half a mile away.

i. That, granting their connection with the Indians, the absence of a growth of forest mould over the workings argues against their great age.

k. Lastly, that the resemblance in make of a certain number of Trenton specimens to the quarry series suggests that the former had been made by modern Indians and intruded by them into the gravels.

After discussing the "turtleback" in its original source and the blade-making camp on the Delaware, Mr Mercer sums up the evidences of his own experiments and the testimony of travelers and historians regarding the process by which the last finishing touches were put upon stone implements of various kinds. The gist of Mr Mercer's argument is summed up on page 85 as follows: "No token of an antecedent race was discovered, either upon the exposed native rock, upon the hills above, or on the beaches below; nor has anything been found anywhere else in the valley to corroborate the alleged antiquity of the chipped blades from Trenton, while, as remarked before, the Trenton case has been somewhat weakened by the appearance among the exhibited list of Drift specimens in the Peabody museum of several blades of common Indian pattern (see figure 11), and of certain 'turtlebacks' (see figure 13), which, judged by form, appear to have been made by Indians at the Gaddis Run quarries. More than ever the question of Glacial man has been narrowed down to evidence produced at one site and to a question of the correctness of observation of individuals."

The Indian ossuary examined on the Choptank river in Maryland reveals two layers in which remains of man existed; one represents the site of an Indian village which existed formerly on the bluff; the occupants made their arrow-heads from jasper pebbles of the neighboring beaches; the ossuary or collection of human bones was constructed in accordance with known Indian customs; and, finally, the bones are those of the Nanticokes who occupied the site until 1722.

The third paper relates to an aboriginal shell heap on York river, Maine. The result of Mr Mercer's inquiries is that the later and upper accumulations belong to a period not more modern than the latter part of the sixteenth century, while the lower portion may represent times several centuries older.

The fourth chapter describes aboriginal remains at a rock-shelter in the Delaware valley. The culture layer in the cave represents the familiar Indian of the Delaware valley. There was no trace of a cave inhabitant, but evidence of the red man, within a time represented by the scope of a few centuries, taking casual shelter in the cave and feasting upon the remains of mussels, turtle, and deer.

The last paper is the description of an exploration of Durham cave, Bucks county, Pennsylvania, in 1893. Archæologists always look carefully at any description of cave hunting by Mr Mercer, as he is the best informed man in our country upon such subjects, having had much experience therein. His conclusion is, " In these once dark inner regions we had failed to find anywhere a significant hearth site, a jasper chip, a potsherd, or an Indian implement of bone or stone." Found therein were part of the refuse of Indian feasts in the outer cave and carried to the recesses of carnivorous animals. There is no proof of the geological antiquity of man.

O. T. MASON.

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THE ABORIGINES OF FORMOSA AND THE LIU-KIU ISLANDS

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A European nation, during three and one-half centuries, has been in possession of the Philippine islands, but in spite of that fact there are even now independent tribes at the very gates of Manila; and the knowledge of the customs, languages, and history of the Philippine aborigines is like that of the Mexican Indians, also ruled by the Spaniards for about the same length of time, still very far from complete. It can therefore be no matter of astonishment that in Formosa, where European nations have founded only short-lived colonies and where the Chinese only during the last 200 years have gradually and painfully worked their way to the interior, and that likewise in the small, easily accessible Liu-kiu islands, untouched by modern investigation until 20 or 25 years ago, our knowledge of the aboriginal tribes should as yet be rather unsatisfactory. There is, however, no lack of learned works and pamphlets on the subject, the literature on the Formosan natives alone comprising at least from 40 to 50 numbers; but the attempts to gather and sift the material and present it from broader views have been few, and the conclusions reached by different authors and explorers have by no means been identical. There is, on the contrary, a growing conviction among experienced anthropologists, such as Joest and Bastian, that we have not only to look at Formosa as a missing link in the great development of the races of the so-called Malayan archipelago, but that the " fair island " has still many intricate problems in store for us.

In all the standard general works like those of Keane and Sievers, in all of the comprehensive special works like the splendid, agreeably written, and luxuriously edited book of the French consul Imbault Huart,[1] the fascinating novel-like narrative of the well-known Canadian missionary Mackay,[2] and the clearly written history of the island by Dr Riess,[3] a professor at the Tokyo University; finally, in most of the short papers and pamphlets published in the *China Review* by the American, Mr Steere, professor at Ann Arbor; the English consul Bullock; the Chinese custom-house inspectors, Mr Taylor, Mr Kleinwaechter, Mr Colquhoun, Mr Lockhart, it is asserted—while other possible theories are often at the same time scornfully rejected—that the present natives of Formosa are pure and unmixed Malays. It is true Mr Riess presents first as his opinion that the original natives sprang from Liu-kiu stock, and he learnedly attempts to prove that the Longjus tribe of south Formosa is even in name identical with the Luchuan race, adding, however, that in his view the original settlers were utterly routed and exterminated by the conquering Malays. It may be mentioned that Dr F. Mueller, the eminent Vienna ethnologist, also accepts the Malayan theory pure and simple, and thus we behold on the great ethnological map, wrought out with the utmost accuracy by Vierenz v. Hardt, according to Dr Mueller's divisions, the eastern Formosans set down as Malays.

There are four writers, though, who refuse to assent to this definition. Three of them hold that at least the northern aborigines are non-Malayan, and they assume that they are akin to the Miaotse, the aborigines of China, still surviving in many central districts of Kwangsi and Yünnan. These three scholars are the German naturalist Schetelig,[4] who visited in 1868 the Kapsulan plain in the northeast of Formosa; Mr Dodd, once in the custom-house service, an excellent scientist and painstaking observer, and the famous French savant Terrien de Lacouperie. Their theory may derive a very appreciable confirmation from a tradition of the north Formosans, who believe that their ancestors, although a non-Chinese race, immigrated from the Chinese mainland. The fourth authority in question, and perhaps the most competent of all, Mr Joest, of Godesberg,[1] who recently started for an extended South Sea exploration, protests that the northern aborigines of Formosa are unlike any other races, whether Malays, Papuans, Miaotze, Mongolians, or Japanese; and as to Negritos, which had been suggested, they bear the same resemblance as a codfish would to a parrot. They remind him somewhat of the Igorrotes of Luzon. The idea that they might possibly have some admixture of Negrito blood, particularly in the case of the *southern* Formosans, has been, in fact, hinted, but only feebly and casually, at different times and by different workers, who have never taken the pains to ascertain and prove their claim, notably by the Dutch historian Valentyn (1724), the English naturalist Swinhoe (about 1866), and the French anthropologist Quatrefages (about 1875).

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[1] L'Île de Formosa, 1893.

[2] From Far Formosa, 1896.

[3] Geschichte der Insel Formosa, 1897.

[4] Steinthal's Zeitschr. zur Völkerk., 1869.

We are thus in deep sea, and if the present writer, after two journeys in Formosa, in 1895 and 1897, attempts to give a few more facts, especially of a linguistic nature, bearing on the subject, he feels by no means able to completely solve this interesting ethnological question. It is, however, clear that the northern Formosans are anything but Malayans, but I am not prepared to state to what particular race they belong. In the physical description of the various tribes I have used to some extent descriptions furnished by some of the writers mentioned above, for though I have seen most of the tribes myself, there is no reason why the accurate observations and apt expressions of men who worked on the spot for a longer time should not be employed. The Japanese, who entered Formosa a little more than two years ago, have also busied themselves in gathering anthropological and linguistic material, but their comprehensive works on the island are, so far as I have seen, notwithstanding their great facilities, only a more or less clever résumé of foreign labors. An honorable exception will be mentioned in due place. I have been able, however, to use a small number (3 or 4) of vocabularies kindly supplied me by Japanese government employés, notably by Mr Osawa and Mr Ino.

One distinction as to the Formosans is recognized throughout the island and considered also in the official intercourse between the powers that be and the natives. It is that of the utterly wild and independent element, called the Chin-hwan or Cheh-wan (literally, "the raw, uncooked savages") and the Sek-wan ("cooked savages"), the former clinging to their time-honored habits, the latter adopting to some degree Chinese dress and Chinese language. This distinction, it will be remarked, is not meant to be one of race, but of civilization. It is, at the same time, a topographical one, for the Chin-hwan live in the highest mountains, in the Alps, towering up to 13,000 feet, while the Sek-hwan occupy the plains and lower valleys of the low sea range.

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[1] Weltfahrten, 1895.

The aborigines who cling to savage state are short of stature, the majority of them being under five feet six inches. Their complexion is of a light reddish brown. Old individuals are rather sallow and swarthy, while the young warriors are much lighter and clearer, being decidedly fairer than many South-Europeans and even many Frenchmen. Their jet-black hair is perfectly straight and lank and is worn long and untrimmed, parted down the middle and usually gathered together at the back by a band of cloth, though sometimes it is allowed to hang loose.

Their broad faces with low brows, their straight and high noses, wide, however, at the nostrils; their lips, not so thick even as those of the Malays, remind many observers of European features. A good deal of speculation has been of course developed upon this subject, and the opinion is frequently heard that there ought to be recognized traces of the old Dutch, who stayed in the island for half a century. I even met people who retailed a wonderful story about French soldiers that, in 1885, retired to the mountains and mingled with the savages. If any stragglers of the French army and a few adventure-loving merchants found pleasure in native women, the percentage of these mixed breeds cannot be very considerable (must, in fact, be quite inappreciable), exceptions, however, being always distinctly pointed out to visitors as in Suas, where lives a famous beauty, the daughter of a foreigner and a native chieftainess. The general expression of those mountain savages is dull and heavy, though somewhat relieved by the dark eyes, which are remarkably bright. Even according to Mr Dodd,[1] many faces show a Malayan type; some have a Jewish and others a European cast. The ears of both sexes are pierced for earrings. Each lobe has a hole through it large enough to receive a piece of bamboo about the size of a Manila cheroot. In the lobes the women usually wear covered bamboo tubes with tufts of scarlet long-ells sticking out of the opening of the upper end; others insert pieces of what appears to be white cuttlefish bone, fixed there by means of a piece of string round the head or attached to a circlet or wreath of embroidered camlets or native-made cloth. On their small tight-fitting caps they frequently fix circular flat pieces of the same bone and glass beads of different colors. All alpine aborigines are intensely fond of all sorts of trinkets, affecting especially necklaces of wild boars' tusks and leopards' teeth. Very peculiar and various is the tattooing. The tattoo used by females consists of three sets of blue lines with four in each set, running from the ears to the corners of the mouth, where one-half of the lines curve off over the upper lip and meet under the nose, the other half descending under the lower lip and meeting on the chin. The middle set of lines differs from the others in having the interstices filled up with diagonal lines, forming a kind of diamond pattern. The tattoo used by males is made up of two to three sets of horizontal lines, with four lines in each set, running down the center of the forehead and chin; and further, with any one who has succeeded in bringing home a head as a trophy, of colored scratches on the breast (with some tribes, on the forehead just above the nose). I saw one middle-aged warrior who proudly showed as many as eight red-blue lines on his forehead, and I heard of an old chief that boasted even of ninety-five marks. Some of the quoted authorities record twenty-nine lines. A further somatic peculiarity, quite generally recorded, is the knocking out of the eye-teeth; but once I found among the dwellers of the vast Morrison range (23½° N.) the eye-teeth filed down obliquely, just as I had seen it years before among the Wapare and Waganda tribes of eastern Central Africa. The absence of those teeth is popularly supposed to improve the wind for hunting, while others consider it increases the beauty of their appearance. The dress of all genuine savages is very scanty, and in the summer often wholly lacking. As a fall dress there is frequently paraded a closely fitting cap (*mobu*) of rattan wicker-work, others strutting around all day long with only the belt (*habbock*) around their waists, with the favorite long knife (*latao*) stuck in it. At the east coast, in the Khilai plain,[1] I beheld also large numbers of Sek-hwan who sported as the only apology for dress a trinket in the hair and an earring. The savages of the high mountains, however, dress quite substantially, especially in winter time, when the peaks of Mt Sylva and Mt Morrison are invariably snow-clad and the snow sometimes almost reaches the plains. The regular costume of these tribes I observed to consist of deerskins cured by exposure to sun and wind, though Chinese cloth, in rare cases bartered for, but usually, I fear, taken from ambushed and murdered Chinese, is by no means despised, and especially coveted by the women, who not infrequently add to their petticoats and sleeveless jackets, embroidered with red threads by their own hands, a second Chinese-made garment. The women also wear a sort of moccasin or garter tied round the calf of the leg, to which are often attached rows of small jingling bells, their heads being uncovered. Their hair is dressed in different styles, but usually plaited and bound behind with red cord. In parts of the island caps, jerkins, and moccasins made of deerskins are worn. The chief is only very little more gaudily dressed than the "commoners," and in many tribes is not distinguished by dress-display at all. His coat is always of the same material and crude shape as that commonly in vogue; occasionally, however, especially in the south, it is adorned with beads and shells stitched on in rows; upon his garters are rows of bells, and on either side feathers are inserted. Finally the cap is ornamented with both beads and feathers, and in front with the top part of an unused opium pipe-bowl. The deerskin coat, bye the bye, is something hardly to be surpassed in rudeness of design and stiffness of hide, but a man covered with this really alpine garment, bearing a wonderful resemblance in the cut to the convenient "Lodenmantel" of the Tyrolese Alps, can screw himself into such a position that no part of his body need be exposed.

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[1] J. Straits Branch, R. A. S., 1885, p. 73, where also more details about dress, etc., are given.

The dwellings are generally of the rudest kind, being mere huts of bamboo and rattan, except in the extreme south, where they are constructed entirely of slate, with roofs thatched with grass, split bamboo arranged like tiles, or with slate stone. Ordinarily, but not always, the floor is lifted a few feet above the ground, as in many islands of the Malay archipelago. The houses have each but one room. The beds are made of split bamboo. The hearth, if in the house, is in the center of the room, but just as often is outside. The center post is adorned with the skulls of animals. Outside of the house, hung under the eaves above the doorway, are the ornaments dearest of all to the aborigines, the skulls and queues of their hated foes, the Chinese and Papohwan. The head-hunting customs, upon which romantic travelers and listeners usually dwell with special delight, and all their concomitant features, such as the drinking carousals, the eating of the brains and hearts, the necessity of having a skull in order to marry or to be elected as a chief, are well enough known to preclude detailed description here. The food of the Formosan aborigines is of the simplest kind, consisting chiefly of game, a little taro, and, if they can afford it, rice. In eating they use their hands only; no chopsticks nor knives. The liquor they drink is manufactured of millet. They are also exceedingly fond of the Chinese samshu, going to any length of concessions to obtain it, and drinking any amount of comradeships for life and death, after having been granted that powerful beverage. A foreigner who would enter the savage dominion must needs, if he is not a missionary or an old resident, buy their good will by a liberal present of samshu or, better still, of one or two pigs, and must after this undergo a curious ceremony of making friendship, the lips of both parties being joined together at the rim of the wooden drinking bowl; also to eat salt from the same dish is a mark of friendship. Much might be said of the superstitions of the Formosans, their worship of spirits, of the demons of the forests, mountains, and streams, of the excessive importance they (like modern Indians and the ancient Romans) attach to the flight and the cries of birds, but it is rather doubtful whether such superstitions can count as racial characteristics, they being found almost universally diffused among uncivilized races. As it is impossible to present here a complete history of savage life in general and the Formosans in particular, only the more striking customs and ideas, which may lead to a solution of the racial problem confronting us in Formosa, can be mentioned. Marriage relations bear directly upon the racial question. In these the northern Formosans are extremely strict, in great contrast to the sensual and debauched natives of the south. Marriages with the northerners are held to be binding for life. It is highly im-proper for a stranger to inquire after or to show any curiosity about the female members of a native party, although women quite readily mingle with men and display but little timidity, except that of the watchful animal ever on the lookout for danger. The unmarried bucks dwell in a house set apart for them at the entrance of the village, a custom mentioned in the book of Judges, and to be met with in many Indonesian and Assam tribes. The Formosans are divided into clans and governed by chiefs, who are commonly said to be invested with absolute power, though my personal experience far from confirms that supposition. As to the construction and design of their villages, as well as in the choice of the material of the houses, I found much variety. Some villages are open, some are stockaded, some are, strictly speaking, no villages at all, one hut being erected here and another there in the distance of a few hundred yards.

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[1] Called after the Khilai river (about 24° N.), Khilai probably meaning *water*, as in some southern Formosan dialects and in Alfurian.

To this general description of Formosan savages I will attach a few notes, chiefly culled from Mr Taylor's essay (China Review, XIV) upon the southern natives, who appear to have a little improved on the general standard of early civilization. They have a goodly number of domesticated animals, such as bullocks, water buffaloes, birds, and, of course, dogs and cats. They are acquainted with the management of boats, and use that strange craft the catamaran; but, strange to say, some coast tribes which I visited do not eat fish. Festivities, with general invitations, feasts, and rejoicings are very common on the slightest pretext. The tattooing is principally around the wrists and on the back of the hands and fingers; the pattern resembles lace-work, the colors being red and blue. The dead are buried inside the houses (a custom my Japanese friends commented upon with great disgust, which, however, occurs also in other localities of Indonesia as well as in Assam). The women weave; the men devote themselves chiefly to agriculture. The people are skilled in the preparation of deerskins, which they make into buff and wear in winter. Among them may be seen expert blacksmiths, and they forge their own guns and agricultural implements. I bought from southern natives a knife of no mean workmanship and of great flexibility. They count about eleven months to the year (the northerners do not seem to know time at all), and they keep account of age. They are also fierce head-hunters. In some localities the finger nails are colored red with the juice of a flower, and the teeth are kept black by chewing a species of vine; they are, besides, exceedingly fond of chewing betel-nut, which they obtain from Chinese peddlers. This may be a habit more recently acquired. Some tribes are very hospitable, while the northerners have been declared by many disgusted visitors to be "about the most inhospitable people on God's earth."[1]

According to the tradition of the southerners, they are descended from two beings, male and female, who in the beginning emerged from a rock that burst open. The high mountains are believed by some to be inhabited by the spirits of departed heroes. When a celebrated chief dies these make a great reception. "The hosts of ghostly heroes whirl to and fro, hurrying, in the eagerness of the greeting, like the rush of a mighty tempest; with cries of welcome the new name is called aloud, and the trembling savage, as he cowers in the brush, thus learns what great chief is departed."[2] Often a lonely native, threading his tortuous path through the mountains, shrinks with terror as invisible hunters, encouraging their wild hounds with weird shouts, sweep along in swift pursuit of the panting deer. Marriages are real love-matches, but marriage obligations are treated lightly; thus divorces are frequent and infidelity is common, it not being considered a heinous sin. Occasionally women are offered to travelers—perhaps only foreign ones—but, if I understand aright, it is in the same way that in "Astoria" the Chinook chief offered his daughter to the great white warrior, *i. e.*, for genuine marriage. The ceremony of marriage being very simple, as it merely takes the form of a public declaration that the couple have become man and wife, misunderstanding appears to be easy. Thus sensational reports as to marriage relations might in this case also be shown to be sheer fiction. It is true that foreigners who have been wedded to native "princesses" generally leave them after a few weeks,[3] but the idea of marriage has been just as really present as, for instance, in that wondrous Sanskrit tale of love, desertion, and reconciliation, the drama Sakuntala. The young unmarried bucks have a kind of club-house at the outskirts of the village, where they indulge in drinking bouts. Probably an out-of-the-way locality is chosen in order to prevent the minds of the very young and tender from being corrupted. At the extreme south a supreme deity called Maratoo and also an after state is believed in. The future life is thought to be regulated by one's acts in this life.

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[1] Guillemard, Cruise of the *Marchesa*.

[2] A few of the beautiful lays of the mountaineers, which occasionally recall MacPherson's Ossian, will soon be edited out of a Chinese encyclopedia by Dr Florenz, professor at Tokyo University.

[3] A record of permanent marriage entered into by a chieftain's daughter with a Spaniard is, however, preserved in Count Beayowsky's autobiography.

In expiation of certain sins the spirits are doomed to roam through the air, being thereby peculiarly irritated and inclining to malignity; wherefore it behooves all to propitiate and avoid them. Thunder is the result of a fight between two spirits, Kakoing and Kalapiet, husband and wife. The former considers his domestic arrangements unsatisfactory and begins to kick the furniture about. His wife, finding words insufficient for defense and retaliation, uncovers herself, whereby she causes lightning. To uncover is, of course, the sign of the utmost degree of scorn and contempt. (The very strange belief of some Central American Indians, that they sprung from the urinating of the lightning, would thus find a convenient explanation.) When a child is born it is immediately plunged into a tub of cold water, as in ancient Germany. People attain a great age, sometimes 100 years. The dead are clothed in their ordinary garments with all ornaments attached, then sewn up in a buffalo skin and buried facing the west. After the grave has been filled up and a small slab of wood erected, each man, as he moves away, flings a handful of earth at the wood and spits on it, repeating a formula to the effect that the deceased must be contented and stay wherever he may have gone; that during his declining years he has been well treated, regardless of the trouble, so he must not think of returning. (In Germany also people are afraid lest the dead may return and try to prevent it by various contrivances, such as putting a broom at the threshold, etc.) If in spite of this warning he persists in returning, he must understand that the spitting and stoning just performed is a sample of what his reception will then be. Weapons are spears and arrows, said to be most deadly, but unfortunately I could not ascertain whether they are poisoned or not. More recently most tribes have, either by barter or by spoil, acquired guns. In warfare the sole purpose of the warriors is to kill each other (many savages, notably in Australia, prefer sham fights or slight wounds). Women and children are never molested; the former are therefore very convenient as interpreters for traveling from one tribe to the other. Sometimes young children, though, are taken prisoners, but are never considered slaves, becoming, on the contrary, part of the captor's family (as the Etruscan Servius Tullius). The priestesses[1] work themselves by contortions and gyrations into a kind of ecstacy, during which they swoon and in this latter state hold converse with their ethereal principals, like the priestesses in Tidor, Gilolo, and neighboring islands or the Greek Pythia. A French traveler of the last century says that for certain rites the priestess has to strip naked; if true, this would be analogous to the same custom in religious dances of the Washenzi, in eastern Africa, and to the modern incantations used by a girl seeking to learn of her future husband in Bavaria.

I will conclude this sketch with an account of a third group of natives, the Diamarocks, a tribe of the southeast. Since a few years people have begun to understand that great differences exist between savages. In fact, all human communities as well as all individuals are possessed of some modicum of civilization, and there is no such thing as a total distinction between savagery and culture. Distinguished from animals, all men have culture, the differences being merely those of degree. These views are confirmed by a study of Formosan natives. When the celebrated chief Tokitok of the Botan league, in the extreme south (the same Tokitok who wrecked an American ship and murdered the crew and was afterwards on excellent terms with his American guest, General Legendre, who investigated the case)—when this great warrior, who wanted to become king of all Formosa, was negotiating with the different tribes to form a vaster confederation, he invited the chief of the Diamarocks to a palaver. In return he was requested to visit the headquarters of the Diamarocks, and went there alone. He was well received. On being introduced to the ruling family he noticed a nice, stout boy, the chief's own son. A little after Tokitok, to his great horror, saw his host deliberately cut the boy's throat and proceed to disembowel him. He remonstrated with the cruel father; but the chief of the Diamarocks looked surprised, and gave it to be understood that he was not to be outdone as to the material of a feast. Since the Diamarocks at the late palaver had been treated so well, they were bound, in return, to place now on the table the best they could produce. Besides, the boy (who I venture to think was probably an adopted slave) would be found very palatable—in fact, as good eating as a pig (which Chinamen and savages esteem the greatest dainty on earth). Tokitok speedily decamped, and could never again be persuaded to enter the Diamarocks' domain. These cannibals are nearly black. Mr Taylor, who is a stout champion of the Malayan theory, thinks they may be the true aborigines of the island, conjecturing that they are a southern branch of the Tangos. This is impossible, for the Diamarocks are black in color, while the northerners are fair. A young Japanese, Mr Torri, has discovered two more black tribes to the north of the Diamarocks, namely, the Kokwi, the Tarlok, and the Bokni.

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[1] A great number of details about these priestesses is to be found in de Mailla (who in 1714 visited Formosa) and in various papers by Mr Taylor.

Trying now to classify the different groups, we shall begin with the north. The northerners call themselves Tayal. This is doubtless the same as Tagal. The only trouble is that there is nothing in common between the Tagal and Tayal languages. One glance at the first numerals will show that:

Tayal	*South Formosan and Tagal*
kotto	isa
sapin	lusa
chinhoat	tolu
sbaiat	supat, ampat
mangan	lima
tai-yu	onuru

The explanation is probably to be found in an absorption of the Luzon Tagals by the invading Malays, who always imposed their idiom on the Negritos. From many similarities, such as head-hunting, the uplifted floor of their huts, the dress, the physical features, and partly the language, it would seem that the Tayal came originally from Assam. Some of these tribes are Yukan, Marai, Tokohaura, Beiwai, Takasan, Tónoba, Kaguizan, To Kwrai, Kuro, Miniebu, Sasan. The second group, the inhabitants of the east coast, except where the mountains approach too closely to the sea, seems to be derived from the Polynesians. In feature and language they are genuine Maori, that race to whom the Hawaiians trace their origin. Their most important tribes are, in the north, the Kamaran or Kabilan; in the south, the Ami, the Lamsihoan (merely Chinese for the southwesterners), the Tipan, the Bantang, the Caviangan, the Kale, and the Salasien. Between the southern and the middle branch of the Polynesians, viz., between the plains of Khilai and Pilam, live the dangerous blacks whose tribes, as far as known, have been mentioned already. The murderous propensities of these Melanesians differ from the head-hunting sport of the other savages, the latter, just like redskins, craving only the honor of the warlike deed, parading the skulls, while the black fiends want to eat the flesh of their enemies. Language and features strongly recall the Papuan type. The fourth group is made up of the Paiwan and Botan, of the extreme south, and all the tribes of the southwest. The language whose numerals were given above is of the northern Malayan type. The fifth group, now living on the mountains near Mt Morrison and once occupying the whole western plain, is again a puzzle. It is certainly not Malayan, it being a well-known fact that from Madagascar to Easter island *five* is *lima* (= hand). The Formosans of the center do not agree in their numerals either with the Malays, the Polynesians, or with each other.

	Favorlang	*Sideis*	*Mt Morrison*	*Tchihuan*
5	dchab	lima	magarr	hassub
6	natap	talap	maturn=2×3	buda=5 and 1
7	naibo	papytto	pitu	bidusut=5 and 2
8	aspaaspat	pagipat	mashupat=2×4	bidutorn
9	tanacho	matanda	mangara	tamoda

It would be difficult to find a more startling dissimilarity within a few miles in any other place of the globe, except, of course, the Caucasus and Lebanon. The rest of the vocabularies, the most common words—such as man, woman, water, fire, sun—are as different as they possibly could be. Now, what on earth are these languages? To what family do they belong? I confess I am unable to say. I have searched assiduously in perhaps more than 120 languages, and I am loth to state anything definite. Only one thing seems certain: all these central Formosan languages are hybrids, formed by the crossing of three, four, or five different stocks. You may imagine the perplexing multitude of forms, if you realize that these hybrid creations have under-gone further changes, have interfered with neighboring dialects and have themselves been influenced by invaders, so that there is no end to the varieties. Thus this sixth group should probably be again broken up into independent families, so that in all we would have to accept seven to eight different groups of native languages, to which should be added Chinese and Japanese.

As to the islands belonging to the Formosa, the dialect of Lambay, in the southwest, collected by the Michigan professor, Mr Steere, is Malayan, while the tongue of the frizzle-haired inhabitants of Tobel Tobago, in the far southeast, shows considerable traces of Melanesian speech.

I will add a few words on the Malayan similarities in America, since the question has recently been raised again in the Transactions of the Canadian Institute.[1] I know that by considering the subject at all I shall incur the wrath of a man for whom I entertain a profound esteem, Dr Daniel Brinton. I must, however, say, that on principle I fail to see how the doctor can make good his utter rejection of the theory. If the Calaveras and Ohio finds show that man was in America, say, two or three hundred thousand years ago, it does not follow at all that the redskins are descended from those ancient Americans. It is a fact that the Aryans, in India, cannot be derived from the first inhabitants of the soils. Then *a priori* a Malay occupation of Canada might have been possible. From Formosa the Malays proceeded to Liu-kiu and Japan, and it would not have been found more difficult to cross the Pacific than to reach Easter island. Perhaps Mr Campbell is right; still I object strongly to his methods. To identify, as he does, tsalata (5) with luwi and lailem, hwul (9) with jalatien, asera, lali, and siwer, needs a considerable stretch of imagination. It is, indeed, altogether impermissible to compare in this haphazard manner. Malays are distinctly different from frizzle-haired Pelew islanders; Sulu are not the same as Dayaks, nor can the Negritos of Malacca, being called Semang, be for a moment considered as Malagassy or Maori. Finally, neither Tagalis, nor Negritos nor Papuans nor Polynesians nor Dayaks are to any intent or purpose Malays, yet Mr Campbell compares all these peoples indiscriminately with his head-hunting Salishans.

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[1] May, 1897.

NORTHERN ELEMENTS IN THE MYTHOLOGY OF THE NAVAHO

FRANZ BOAS

The general character of the Navaho legends recorded by Dr Washington Matthews differs fundamentally from traditions collected in the northern portion of our continent. Different geographical surroundings and the influence of a different culture convey the strong impression that we have to deal with material that sprang from independent sources. I was much interested in finding on a close examination of the Navaho legends that there was interwoven with a large mass of material foreign to northern tribes many tales undoubtedly derived from the same sources from which the northern tales spring. Most of them are so complex and curious that, taken in connection with the known northern affiliations of the Navaho, they must be considered as a definite proof of either a survival of ancient myths or as proving a later connection.

I will briefly enumerate here the legends or parts of legends which I think must be considered as belonging to the northern area.

Among the Coyote tales is one (Matthews, Navaho Legends, p. 87) in which it is told how the Coyote visited the Porcupine, who scratched his nose until blood flowed freely out over it; he then roasted it until it turned into a piece of fine meat. Coyote invited his host to return the visit in two days. He tried to imitate the Porcupine, but failed ignominiously. He next visited the Wolf, who roasted two arrowpoints that were transformed into minced meat. Again the Coyote tried to imitate his host, but failed. Compare with this the tradition of the Chinook, who tell how Bluejay tried to imitate his host (Boas, Chinook Texts, p. 178); that of the Comox, Nootka, and Kwakiutl of Vancouver island, and of the Bella Coola and Tsimshian of Northern British Columbia (Boas, Indianische Sagen von der Nord-Pacifischen Kueste Amerikas, pp. 76, 106, 177, 245), who tell the same story of the Raven; that of the Ponca (Dorsey, The Cegiha Language, p. 557), who tell the same story of Ictinike, and that of the Micmac (Rand, Legends of the Micmacs, pp. 300, 302), who relate how the Rabbit tried to imitate his host. Although the peculiar method of producing food by magic is not always the same, the whole stories are identical to all intents and purposes.

Later on it is told how the Coyote was playing with his eyes, tearing them out of their sockets and throwing them up; then they fell back into their sockets (Matthews, p. 90). We find the identical incident among the Shuswap in the interior of British Columbia (Boas, Sagen, etc., p. 8) and among the Blackfeet (Grinnell, Blackfoot Lodge Tales, p. 153).

Once upon a time the Coyote met the Brown Giant. He proposed to him that they should vomit. He placed a large piece of pine bark before each as a dish, and bade the Brown Giant keep his eyes shut till he was told to open them. Coyote vomited bugs and worms, while the Brown Giant vomited fat venison. Coyote exchanged the dishes, and then told the Giant to open his eyes (Matthews, p. 227). The Shuswap ascribe the same trick to Coyote when he met the Cannibal Owl (Boas, Sagen, etc., p. 9).

The people sought to divine their fate. .They threw a hide-scraper into the water, saying, "If it sinks, we perish; if it floats, we live." It floated, and all rejoiced. Then Coyote repeated the same test with a stone. It sank, and therefore people die (Matthews, p. 77). Among the Blackfeet the first woman asked the "Old Man" if people would be immortal. In order to decide this question he threw a buffalo chip into the water, saying that if it floated people would resurrect on the fourth day after their death. It floated. Then the woman took a stone, saying, "If it floats, we will always live; if it sinks, people must die." It sank, and therefore people die (Grinnell, Blackfoot Lodge Tales, pp. 138, 139).

One of the most striking resemblances between the myths of the Navaho and those of the Northwest is the visit of the War Gods to their father, the Sun. A brief abstract of this portion of the myth is as follows: The War Gods, the sons of the Sun, leave the earth in quest of their father. On their way they meet the Spider Woman, who advises them in regard to a number of dangers that they will encounter on their way. These were the crushing rocks which close upon those who try to pass them, the reeds with leaves as sharp as knives, a country covered with cane cacti, and the land of the rising sands. They pass these and reach the house of the Sun, the door of which is guarded by pairs of sentinels—bears, serpents, wind, and lightning—two of each kind. When the Sun enters he is angry and tries to kill the intruders on sharp spikes with which the floor of his house is covered. Then he tries to kill them in an overheated sweat-house, and finally by means of poisonous tobacco (p. 109, ff.).

One of the most important legends of northwestern America, which occurs in a great number of versions, tells how one or two boys visited the Sun in quest of a wife. They are warned of the dangers of the road by two women. The last of these dangers is generally the snapping door of the Sun's house. After arriving at the house the young man marries the Sun's daughter. The Sun next tries to kill him by means of the sharp spikes on the floor of his house (Boas, l. c., pp. 39, 66, 111, 118, 136, 171). The visitor succeeds in crushing these spikes, and is then led to a tree that is being split. The Sun knocks the wedges out of the tree, intending to crush his son-in-law, who escapes in a miraculous way (Boas, l. c., pp. 39, 67, 70, 111, 118, 171, 136, 198; Chinook, l. c., p. 34). The other tests vary, but the test of the overheated sweat-house is not absent. It is found among the Chinook (l. c., p. 58) and the Ponca (l. c., p. 160). The most striking similarities in these tales are the visit to the Sun with the subsequent attempts on the life of the visitor, the spikes on the floor of the Sun's house, and the test in the overheated sweat-house. In one version of the Navaho legend it is also described how the woman who warned the young men hardened their skins so that the spikes could not hurt them (p. 232). The same incident occurs in all the corresponding legends from northwest America.

To a similar class of legends belong the attempts of Deer Raiser on the life of his son-in-law, Naçĭ′nĕsçxani (Matthews, pp. 186, ff.), which find their analogy in the tales mentioned above, as well as in a Micmac legend recorded by Rand (l. c., p. 90), in which the wife's mother tries to kill her son-in-law.

The manner in which the people were saved from the deluge also finds its analogy in the Northwest. According to the Navaho legend the people entered a hollow reed, which swayed with the motion of the waters (p. 75). In the legend of the Tsetsaut, an Athapascan tribe of southern Alaska, they saved themselves in two hollow trees that were swaying to and fro as the water rose (Journ. Am. Folklore, 1896, p. 262).

Another interesting legend which has close analogies in the

Northwest is that of the man who was carried to the eyrie of a fabulous eagle. When the eagle drops him into his nest he squirts on the rock some blood that he carried in a bag, and thus makes him believe that he has been killed. The eaglets complain that the food that their father has brought is still alive, but he flies away. Then the man asks the eaglets: "When will your father come back, and where will he sit when he comes?" They answered: "He will return when we have a he-rain (thunderstorm)." Upon being further questioned they said that their mother would return when they had a she-rain (without thunder and lightning). The man then kills the old eagles when they return. He threw the young ones out of the nest, transforming them into an eagle and an owl (Matthews, pp. 119, 120). The Shuswap tell of a similar incident. A man is carried by an eagle to his nest. He is thrown against a rock and deceives the eagle by squirting red and white paint out of his mouth. Then he threatens the eaglets and by their help induces the old eagle to sit in a position in which he is able to kill her. Then the eaglets carry him down from the eyrie, and upon arriving on level ground he kills them (Boas, Sagen, etc., p. 4). The Ponca tell of a similar incident, but the eagles are made to reside in the sky (Dorsey, p. 30). Here it is said that the male eagle returns with the rain, the female with the darkness. Among the Hare Indians we find a tale of a man who climbed an eagle's nest in a fir tree. He awaits the arrival of the old eagles and is told by the eagles that their father arrives with a bright light, while their mother arrives with the night. The man finally killed the eaglets (Petitot, Traditions Indiennes du Canada Nord-Ouest, p. 144). The Dog Rib Indians tell the same story, but the male brings the snow, the female the rain. The man then kills the old ones and transforms the man-eating eaglet into an eagle living on fish (ibid., pp. 323, 324). Petitot records the same story from the Chippewayans (l. c., p. 359).

While I consider that these coincidences have considerable weight as evidence of elements of common origin in the mythologies of the Northwest and of the Southwest, the following are so general that their value is open to doubt. Still in connection with the preceding they are of considerable interest, no matter if we prefer to interpret them as analogous independent phenomena or as due to dissemination.

On page 91 it is told that the vital principle of the Coyote was kept in the tip of his nose and in the end of his tail. The Tillamook of Oregon tell that a certain spirit kept her vital principle in her hat. The Cathlamet of Columbia river tell of a being who kept it in her little finger, while the Kwakiutl relate that a certain spirit was able to lay it aside and kept it in a knot-hole.

The incident of the alien god who flung visitors down a precipice and who is finally flung down himself by the War God, to be eaten by his children at the base of the cliff (p. 122), reminds us somewhat of the corresponding incident in the Cikla legend of the Chinook (l. c., p. 21) and of the Micmac legend quoted before (Rand, l. c., p. 90).

In the legend of the visit of the War Gods to their father, the Sun, it is told how the Sun entered his house, hung up the sun on a peg, and gave his visitors irresistible weapons and protective armor (pp. 111, 113). We find the same incident in a Cathlamet myth relating a visit to the Sun, in which the man when carrying the Sun's arms is compelled to kill all whom he encounters.

The legend of Naçĭ'nĕsçxani, who was enclosed in a hollow log and drifted down the river, reminds us somewhat of corresponding tales of the northern Athapascans which were recorded by Petitot (l. c., p. 56).

Other incidents which resemble those of northern legends are so general in character that I do not ascribe any weight to them as proving common origin of these legends. Such are the power of the hunters of reducing the bulk of their game in order to carry it home, which art the Coyote tries to practice among the Navaho as well (p. 97) as among the Kootenay (Verh. Berliner Ges. fuer Anthrop. 1891, p. 170); the magical descent from a great height, which proceeds without danger so long as the person keeps his eyes shut (p. 121); children formed of the epidermis that a woman rubs from her body (p. 148), which incident is of very frequent occurrence in northern traditions (see Boas, Sagen, etc., p. 358, No. 93), and small dishes of food which prove inexhaustible (pp. 165, 199), which compare with the references ibid., p. 360, No. 142.

The more elaborate tales which are worked into the fabric of the legends of the Navaho and which are common to their mythology and to that of the northwest coast seem to me to be a certain proof of the complex origin of the Navaho traditions. It is important to note that coincidences with Siouan and Algonquian legends are rare, and that only such are found as occur also on the north Pacific coast. It may be that a more detailed comparison with the mythologies of these tribes would reveal additional material common to them, but so far I have not been able to detect additional striking resemblances of complex tales. If no additional material common to the Navaho and to the tribes of the Mississippi basin and of the Northeast should be found, this would prove that the Navaho mythology has been influenced by those of the northwestern tribes, but not by those of the tribes of the Atlantic coast.

ON CERTAIN STONE IMAGES

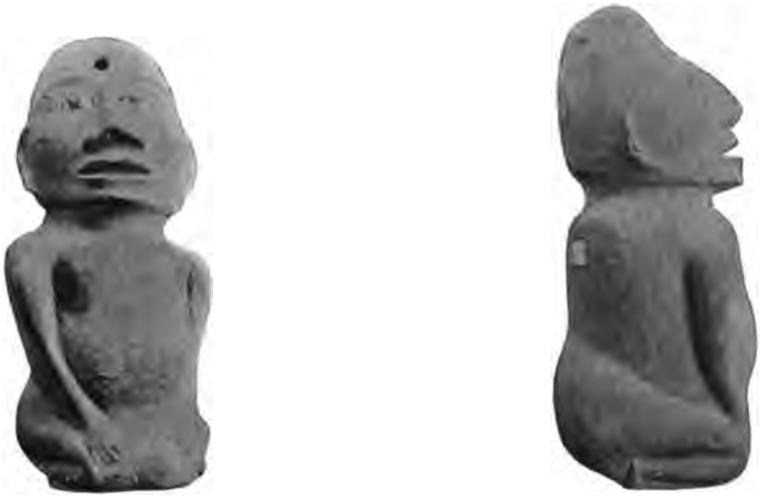
CYRUS THOMAS

As the subject of stone images of a certain type, brought forward in my paper (*American Anthropologist* for December, 1896), has been continued by the interesting communication of Professor Frederick Starr regarding some stone images from Mexico (*American Anthropologist* for February, 1897), it may be well to add notice of one found in the state of Washington by Dr James T. White, of Seattle.

Little is known of the history of this image, of which a side and a front view are given here. Dr White writes as follows in regard to it:

"It is of a blue, rather hard and compact sandstone, 8¾ inches high, and weighs five pounds. The hole in the forehead goes through the head and appears to have been drilled. The eyes are pieces of some marine shell, species not determined. The workmanship is good, the carving neatly done, and the surface well dressed. I regret to say we have no history of the image. It was presented to our Young Naturalists' Society some years ago by a Mr Richards, now dead, who gave a party of Indians something to eat for it, but made no effort to find out who they were or where they were from. In all probability it came from San Juan islands, and Judge Wickersham's explanation of its use (given below) is the most probable one.

"I wrote to Hon. James Wickersham, Tacoma, in regard to



STONE IMAGE WITH EYES OF SHELL, FROM THE NORTHWEST COAST

it, inclosing photographs. The following is an extract from his reply:

" 'I notice in the forehead a hole which is found in many of the surface faces of stone on the beach. I have in my collection just such an image. It is made of a gray sandstone; is about 10 inches high; has a low forehead, just like your image, and has also one or two holes made in the stone before it was fashioned into an image and while it was immersed at high tide on the beach. It was made at Neah bay by an Indian fisherman after the death of a native, and taken, in his place, in the canoe to the fishing grounds. Here it was lowered by a rope into the water, and was supposed to have "power" to attract fish and bring luck. I could not find that it had any other use, or that it was used in worship, or represented anything more than what we know as the dead fisherman's *tamanous* or luck. It is very similar in appearance to yours, and I suggest a similar origin.' "

This statement by Judge Wickersham, who is widely known as a close observing archeologist, is very interesting.

GEOGRAPHICAL DISTRIBUTION OF THE MUSICAL BOW

OTIS T. MASON

Mr Saville's note in the *Anthropologist* for August, describing the "hool," a musical instrument played by the Mayas, at Loltun, in Yucatan, adds another area to the distribution of the "musical bow." About five years ago a native Zulu negro came into my office, having in his hand the instrument described below as No. 95201 in the National Museum. He played upon it by holding the bow in his left hand and spreading his capacious mouth on the back of the lower limb. He had in his right hand a piece of twisted wire, and produced most weird and entertaining music by striking on the string therewith and at the same time changing the volumes of the buccal cavity. The apparatus interested me so much that is was bought for the musical collection and is now among our treasures.

Mr E. H. Hawley, who has charge of the musical collection in the Museum and who has given a great deal of time to studying it, furnishes me with the following material describing "musical bows" that have come under his knowledge, some of which are in the National collection. The native name and the description of the instruments are taken from Mr Hawley's notes.

Zulu (*Samuius*). A short, flat, wide bow with one string of steel wire, gut, or vegetal fiber. In the specimen here described the steel string is rapidly struck with a double and twisted steel wire while the back of the bow is held against the open mouth, which acts as a resonator. The tones are varied by changing the capacity of the mouth. A variety of notes can be produced by this means. (Cat. No. 95201, U. S. N. M.)

Zulu (*Gubo*). Bow not over two feet long; string played by placing a loose reed against it, resting the other end against the body, and striking the string with a slender reed.

Angola (*Hunga*). Bow with gourd resonator open like a bell tied to its back. The tunes are varied by the amount of opening between the player's body and the gourd and by moving it over different parts of the stomach. The string is held between the finger and the thumb and beaten with a slender cane. (Cat. No. 151,140, U. S. N. M.)

Angola, Africa (*N'Kungo*). Bow a curved whip; string a plant fiber, with a loop tied around both string and bow. Struck with a small stick.

Damaras, Africa. Bow same as one used in war or the chase. A loop of hide or string is passed around both bow and string and drawn tight, acting as a bridge near the middle, producing two sounds. The end of the bow is held between the teeth, and the string is struck with a small stick.

Hottentot (*Gom-gom*). A bow with a single string. This string is cut near one end and the flattened barrel of a quill tied to join the two pieces. Sometimes the quill is replaced by a piece of a cocoanut shell. The quill or shell is held against the lips of the player, something like a comb covered with thin paper. The player sits down, grasping the bow near its middle with his right hand; at the same time one finger of his hand is placed in his ear, the other in his nostril, and with a stick 5 or 6 inches long in his left hand he strikes the bow-string in several places. The sound produced is soft and low. Five notes can be effected. Between the fundamental tone and its octave there are three intervals. This instrument is also called "Gorah" or "Goura" by the Bushman, and "Joumjoum" when played by the women.

Mashonaland, Africa (*Wedsa*). Similar to the bow of the chase or war. To it is tied a gourd resonator, which is held against the body while the string is struck with a stick.

Mozambique (*Bobre*). A bow with a single string and a gourd tied to the back of the bow as a resonator, struck with a drumstick, on the head of which is a rag enclosing some seeds, forming a rattle. The specimen in the National Museum (Cat. No. 94661) has a round stick for the bow 80 inches long; the gourd resonator has a diameter of 4¾ inches and a height of 4 inches. The gourd has an opening at its lower end, which is held against the naked body of the player. The sound produced is somewhat modified by varying the opening between the lower edge of the gourd and the player's body.

Lake regions, Africa (*Kinada*). Small bow with one string and a gourd resonator tied to it; held in the left hand and struck with a stick in the right. Sometimes the bow passed through the gourd.

Madagascar (*Zedzi lava*). Bow, a cylindrical stick, to which is tied two-thirds of a gourd for a resonator; string, a three ply cord of vegetable fiber; bow held in left hand and the open part of the gourd pressed against the player's chest. In his right hand is held a small rattle of palm leaf; also a slender stalk of split cane, with which he strikes the string, its note blending with the sound of the rattle.

New Britain (*A-Pagola*). Has two strings, one of which is bent down almost to the bow and held by a loop of cord. It is tuned by moving this loop to or from the middle. The end of the bow is held by the mouth, which acts as a resonator. The strings are beaten by a stick in the right hand, the left stopping the strings. A woman's instrument.

New Guinea (*Pagola*). The bow, strung, is held partly by the mouth, the string being pressed by the thumb of the right hand and struck with a stick in the left. Played by women only.

Florida island, 9 S., 160 E. (*Kolove*). A small musical bow struck with a stick. One end of the bow is held by the teeth to reënforce the sound.

Pentecost island, 16 S., 128 E. (*Vuhudendung*). A small flat, thin bow of wood. The string passes from a hole near one end to a stud or spur formed on the other. It is held by the teeth and the string struck with a double stick.

Interior of Brazil (*Umcunga*). Bow of rattan, string stretched from one end to about two-thirds its length and tied. Beaten with a small stick, the bow being held against the throat or vocal cords.

Tule, California (*Mawahellis*). A tule reed with a longitudinal half section of the upper joint removed and a hole made in the lower end for a vertical tuning peg. String of gut. It is not known how it is played. (Cat. No. 19, 87 U. S. Nat. Museum, Section Music.)

Pueblo, New Mexico (*Thlin-thli-no-me*). A round stick with a rude tuning peg through one end. One string, supposed to be struck with a small stick. (Cat. No. 48089, U. S. Nat. Museum.)

After looking over the musical collection of the United States National Museum and such literature as has been collected by the Bureau of American Ethnology, I have come to the conclusion that stringed musical instruments were not known to any of the aborigines of the Western Hemisphere before Columbus. Those who have read my paper on "The Introduction of the Iron Age into America" will remember that attention is there called to the very early intrusion of African arts into the Latin-American areas. In one case we have a musical instrument imported by negro slaves given to the Indians with its native African name and abandoned by the negroes themselves.

BOOK REVIEWS

Die Göttergestalten der Mayahandschriften. Ein mythologisches Kulturbild aus dem alten Amerika. Von Dr Paul Schellhas. Dresden: Richard Bertling, 1897. 8°, 34 pp., 2 pl., 75 figs.

Eleven years ago Dr Schellhas, recognizing the convenience it would be to students of the Maya codices to have a provisional nomenclature of the figures of the gods in these writings, suggested the adoption of an algebraic method. He separated the figures represented in these codices into types and designated them by letters, *A*, *B*, *C*, *D*, etc. This method was still further elaborated in an article on the forms of the gods depicted in Maya codices, published in 1892. He has now brought the subject up to date in a neat pamphlet, which every one interested in Maya pictography should carefully study.

Dr Schellhas, using his new method, pointed out in his first article the probable identification of figures in the codices thus designated with names of gods mentioned in early Spanish writings. In his latest contribution he broadens this identification, ably discussing suggestions and improvements by other authors which have appeared in the interim. The article has for a frontispiece a chromolithographic reproduction of plate 11 of the Codex Dresdensis and seventy-five cuts in the text. It is appropriately dedicated to Dr Förstemann, who has done so much to advance the study of the Maya codices.

The fact that Dr Schellhas' algebraic method of designating the figures of the gods in the Maya writings has been adopted by the best scholars renders any commendation of it in this brief notice quite superfluous. J. WALTER FEWKES.

The History of Mankind, by Professor Friedrich Ratzel. Translated from the second German edition by A. J. Butler, M. A. Vol. II. London: Macmillan & Co., Limited. New York: The Macmillan Co., 1897. Roy. 8°, xiv, 562 pp., 2 maps, 10 col. plates, 352 figs. ($4.00.)

When the first volume of the English edition of Professor Ratzel's work made its appearance it was our pleasure to say that it formed one of the most important contributions to English anthropologic literature made in recent years. The second volume upholds the assertion previously made, and its standard of excellence has been fully maintained.

The volume completes Book II, which treats of "The Americans" and "The Arctic Races of the New World." Book III is devoted to "The Light Stocks of South and Central Africa." Book IV (to be completed in the third volume) covers "The Negro Races," the South and East Africans only being described in the present volume.

The volume under discussion is of special interest to American anthropologists, inasmuch as the aboriginal inhabitants of the New World are therein discussed. It would scarcely be expected that any European, not excepting even so eminent an authority as Professor Ratzel, could treat the subject of the ethnology of the American races and at the same time avoid the pitfalls which even American students have encountered, unless, perchance, he had grown intimate through personal contact; and yet the author has done the work so well that no one, we believe, will find any serious fault with it. The facility with which Professor Ratzel has utilized the inexhaustible data evidently at his disposal and the eminently successful manner in which he has separated the true from the untrue have made his *History of Mankind* a work of high value.

It is sincerely hoped that the third and final volume will contain an exhaustive index of the three, and that a list of authorities will also be included. With these, Ratzel's work should have a place among the reference books of every English-reading student of the history of man. F. W. HODGE.

Dr Paul Ehrenreich: Anthropologische Studien über die Urbewohner Brasiliens, vornehmlich der Staaten Matto Grosso, Goyaz und Amazonas (Purus-Gebiet). Nach eigenen Aufnahmen und Beobachtungen in den Jahren 1887 bis 1889. Mit zahlreichen Abbildungen und Tafeln. Braunschweig, Fr. Vieweg und Sohn. 1897. 4°, viii + 168 pp.

This comprehensive work records the results of somatologic researches made among indigenous tribes in the southern and central portions of Brazil. The author is not a novice in South American exploration, having studied the Botocudos in Espiritu Santo long before he started, in company with Karl von den Steinen, on his second expedition to the Shingu and its tributaries in 1887, and it is to him that we owe a more thorough knowledge of the Botocudo or Aimore language than was ever acquired by Castelnau or von Martius. When von den Steinen's second journey came to an end Dr Ehrenreich separated from the party, and, bent on further research, alone descended the Araguaya and ascended the Amazon to the Purus. The tribes he specially investigated there were the Ipurinas, the Yamamadis, and the Paumaris.

Whatsoever it was possible to achieve in somatologic and purely anthropologic research among these tribes he performed. He measured only 184 individuals belonging to seventeen tribes, but of these he took all the measurements that could be demanded by the most enthusiastic votary of science. He photographed about the same number of individuals, but the shyness of the women prevented him from obtaining as many facts with reference to the female sex as to the male. In the measurement of the heads Virchow's craniometer was used. The four great racial groups of Brazil—the Caribs, Tupis, Arowaks, and Gés—are all represented.

An interesting chapter is devoted to a pathological discoloration of the skin noted on many individuals on the Purus river and vicinity. Von Martius mentions a tribe there whose name, Purupurús, is derived from the disease, it signifying "the spotted ones." The discoloration begins at the age of puberty and is first bluish gray, afterward changing to a whitish hue. The change of complexion does not become complete until advanced age, and in the meantime the health of those affected does not seem to be at all impaired. The disorder is, however, contagious, and Ehrenreich ascribes it to a parasitic skin disease of vegetal origin.

The tallest race seen by the Doctor and von den Steinen was the Bororós, on the San Lourenço river, their stature exceeding 1.70 meters, approaching therefore that of the Osages and Karankawas of North America. As the pursuits of the Shingu tribes are agriculture and hunting, their legs are found to be longer than their arms. Judging from the portraits, most of which were taken from both front and side, not many of the natives have high cheek-bones or are prognathous. They have mostly round and happy-looking faces, straight hair, and clean-cut lips. Some of them look wild, but these instances are not more frequent than in the case of their red brothers of the United States.

A clear distinction between the tribes of the Arowak (or Maipure), the Carib or Galibi, and the Tupi-Guarani stocks was not made until the first expedition of von den Steinen to the upper Shingu river. The confusion was chiefly one of language, for the tribes of all these three stocks had borrowed extensively from each other's vocabularies. But the above-named explorer discovered in the Baka-iri the true, old Carib language and race, undisturbed by foreign admixtures. This enabled him and other investigators to separate accurately the Carib dialects of all South America from the Arowak and Tupi dialects, an enormous gain for ethnography. This also places the present work of Ehrenreich on a true scientific foundation.[1]

The preface of 44 pages is intended to instruct the reader as to the point of view from which the study of ethnography should be undertaken, and is one of the best treatises on that subject we have ever seen.

A. S. GATSCHET.

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[1] Compare Ehrenreich's treatise on Brazilian races and languages (Petermann's Mittheilungen, May and June, 1895, with map), in which eight families of languages and of races are established and described.

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HABITATION.—Apropos of Mr Cushing's discovery of the remains of supposed pile dwellings in Florida, it is interesting to learn from Mr H. A. Ernst, of Youngstown, Ohio, that the Seminoles in the Everglades erect in every "shach" or hut one or more tables, using the corner posts as supports. In a photograph in the United States National Museum the table resembles a floor raised some feet above the ground.

The use of these strongly built tables is obvious. When one visits a camp of the Seminoles he observes that they do not sit up to a table, but sit on it, sometimes 15 or 20 persons at a time. The pot of "sofka" or corn soup is in the center, and the large wooden spoon is passed around to the men and children, the women afterward eating by themselves. The Seminoles select dry places for their camps, and do not erect their tables upon piles in the water. When hunting, the men rest on the Everglade islands.

O. T. MASON.

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TREPHINING IN MEXICO

CARL LUMHOLTZ AND ALEŠ HRDLICKA

I

During my last expedition to Mexico for the American Museum of Natural History of New York (1894–1897) I (Lumholtz) traveled for some time among the Tarahumares in the southern part of Chihuahua. For about a fortnight I stayed in a remote section of the Sierra Madre, called by the Mexicans *Pino Gordo* on account of its magnificent pine trees, about one and a half days' journey to the north of the once well-known mining place of Guadalupe y Calvo. Through this district there leads a lonely trail, which is used perhaps once a month by Mexicans living at the Guachochic ranch when journeying to Guadalupe y Calvo. Here in the adjoining deep barrancas live the Indians, who are all Tarahumares, being rarely disturbed by the whites. They are all "*gentiles*," the name applied by the Mexicans to heathen Indians who do not frequently come in contact with the whites, and from whom, naturally, I always got the best results. Not only are they the best subjects for study, but, having been less corrupted by advancing civilization, they are far more obliging when one succeeds in gaining their confidence than those who have lost their natural naïveté by Caucasian contamination.

On the occasion referred to, the principal man of the district, who had become attached to me, showed me a burial cave. I had persuaded him that it was better that I should take away the bones contained in it in order to keep them in a good house than that they should remain where they were, "killing sheep and making people sick." "But why do you want them?" he asked. Having been satisfied on that point, he one day led the way to a wild, steep arroyo, pointed at its head, and, having thus indicated where the cave was, at once left me. I made my way the best I could up this steep little gorge, accompanied by one of my men. On arriving at the top of it I found the entrance to the cave completely covered with stones plastered together with mud. A great heap of stones was also piled up outside against the wall.

The cave was found to be very small, and, contrary to the exaggerated reports of the Indians, it contained only three skeletons. According to the custom prevailing throughout most of the country of the Tarahumares, these remains had not been buried, but the skeletons were lying on their backs, their skulls turned toward the east. A few crudely made clay vessels of the ordinary Tarahumare type accompanied the skeletons. On gathering the three skulls I was at once struck by a circular hole in the right parietal bone of one of them. As they undoubtedly belonged to the Tarahumare, the question at once occurred to me, Could it be possible that this barbaric tribe, not particularly advanced in the arts, was capable of trephining? The remoteness of the place entirely negatives the suggestion that a civilized surgeon could have had anything to do with it.

The skull (figures 1, 2, 3), of which the lower jaw is missing, is that of a female over 60 years of age. It is impossible to arrive at the age of the specimen, on account of the peculiar circumstances in which it was preserved; however, the cranial walls still contain some animal matter, they are still somewhat fatty to touch, and retain some odor. A spindle (provided with a whorl made from a piece of pine bark) which was lying among the bones in this cave indicates that the body of this female had not been put there in recent times. This variety of whorl, so far as we can ascertain, has not been observed among the Tarahumares of the present day; it is indeed possible that the skeleton may be pre-Columbian.

The skull does not present any deformities or fractures, nor is there anything pathological about it. There are no traces of any injury on either of the skull tables; it shows, however, evidences of a superficial injury of the bone at about the middle of the junction of the right parietal with the occipital.

The singular aperture is situated in the anterior and superior

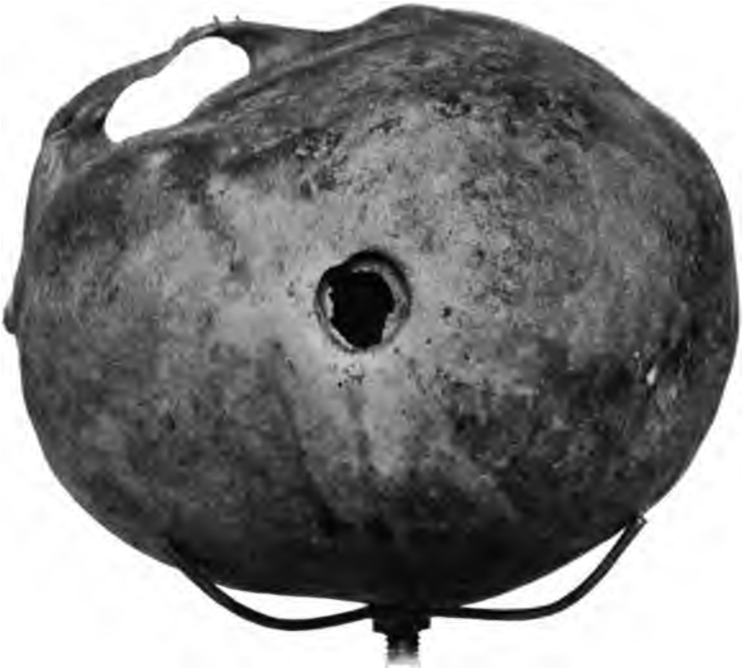

FIG. 1—TREPHINED TARAHUMARE SKULL, FEMALE

Seen from above

Am. Mus. Nat. Hist., New York, Lumholtz Coll.

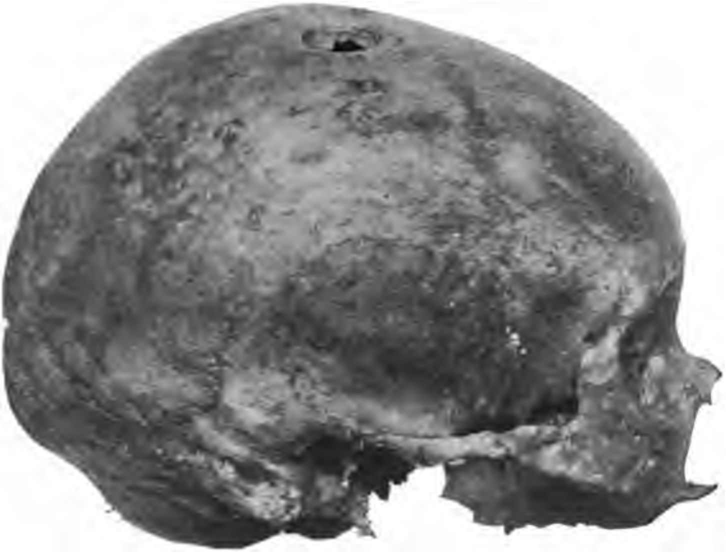

FIG. 2—TREPHINED TARAHUMARE SKULL, FEMALE

Seen from one side

Am. Mus. Nat. Hist., New York, Lumholtz Coll.

part of the right parietal bone, 1.3 cm. back of the coronal, and 2.3 cm. below the sagittal suture. It is almost exactly round, measuring 2 cm. in diameter; and the regularity of the hole indicates without a doubt that it is artificial. The outer edge of the hole is smooth and somewhat sunken, the parietes ascending from it; the inner edge is partly obliterated by a lamella of thin bone which proceeds from all parts of the inner edge to the

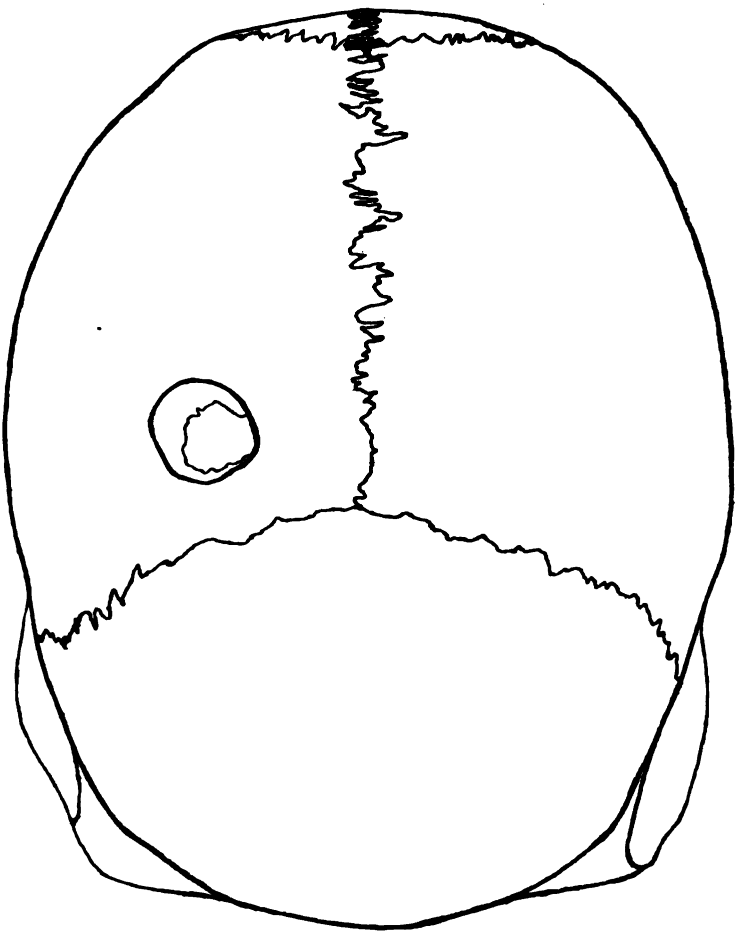

FIG. 3—TREPHINED TARAHUMARE SKULL, FEMALE

Am. Mus. Nat. Hist., New York, Lumholtz Coll.

center, and whose free edge is very sharp and irregular. Viewed from the inside of the skull, this lamella appears smooth, and directly continuous with the inner skull surface. It is very probable that part, at least, of this lamella remained after the wound had been made.

The walls of the opening are quite smooth and are covered with a compact bony tissue. This fact, in connection with the smooth and slightly sunken external edge, shows that the wound was made a long time, several years, before the death of the person.

One would expect that trephining among the Tarahumares would have been done in the most primitive way, by scraping; but the almost circular form of the opening, and its perpendicular walls, which show no signs of beveling, do not admit of this conclusion. The senior author has never found among the Tarahumares any implement which afforded a suggestion that it had been used for such an operation. At present they do not use any stone implements except plowshares, and the art of trephining has apparently become obsolete.

One is forced to believe that the case of trephining in question was produced by a kind of flint wimble with three teeth, very much like the instruments of iron used today in trephining by the Berbers of l'Aurés (Lumholtz).[1]

Description of the Skull

The skull is slightly more massive than are the average female skulls from the same tribe of people. The parietes range in thickness from 4 to 5 mm. There is no asymmetry.

The forehead of the cranium is low, though fairly well arched. The sagittal region is somewhat elevated from the bregma to the obelion, forming a low, wide ridge, rounded on the top. The parietal bosses project but little. The temporal region is full. The occiput is full, the inion region prominent.

The base of the skull is flatter than normal. The basal processes are of a medium strength; the styloids 1.65 cm. long, of medium thickness. The mastoids are small. The foramina are all of a good size, the internal auditory meati larger than the average. The right jugular foramen is large. The posterior nares are regular, slightly broader than high (*vide* measurements). The zygomatic arches are of a medium expanse. The palate is elliptical in shape and regular.

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[1] See an interesting article by Drs Henri Malbot and R. Vernau, "Les Chaouias et la trepanation du crane dans l'Aurés" (vol. II, "Revue d'Anthropologie," 1897), in which an illustration of this implement is given.

The supra-orbital ridges are small; glabella low, slightly convex; nasion depression small. The nasal bridge is rather low and very concave. The orbits are regular, their borders of medium sharpness, the right slightly broader. The long axes of their exterior planes meet about 3 mm. above the ophryon. The malars are small in size, but quite massive and prominent, especially at their upper (orbital) border; canine fossæ medium; nasal aperture wide; spine low, 0.8 cm. long, small echancrures on both sides of it; upper dental arch almost completely absorbed.

The cranial sutures show a rather simple serration. The pterions are formed *en H* (medium breadth). There is a large epactal bone (11.5 × 3.4) at lambda; no wormians. The ossification is much advanced, and comprises, from before backward, all the nasal and most of the orbital sutures, all the coronal except the parts between the two temporal ridges on each side, both pteric, anterior third of sagittal and around obelion, most of the temporo-parietals, a spot in the lambdoid on right, and the right temporo-occipital.

All the cranial measurements, as well as the type of the skull, agree well with those of the average female Tarahumare. These measurements are given in full for the sake of completeness.

Measurements

Capacity (Flower's method)	1,210	cc.
Diameter anterio-posterior maximum	17.5	cm.
Diameter lateral maximum	13.0	"
Cephalic index (dolichocephalic)	74.3	
Nose: Height	4.45	"
Breadth	2.95	"
Nasal index (platyrhinic)	66.3	"
Orbits: Height (mean)	3.55	"
Breadth (mean)	4.05	"
Orbital index (mesoseme)	87.6	
Face: Height indeterminable on account of the absorption of the upper dental arch.		
Widths: Diameter frontal minimum	9.4	"
" external orbital	10.2	"
" bijugal	10.8	"
(Bizygomatic maximum	12.7	")

Cranium: Widths: Diameter bistephanic	11.0	cm.
“ biauricular (vertically above meati)	12.1	“
“ between the centers of parietal bosses	12.6	“
“ bimastoid	10.3	“
Arcs: Centers of ext. aud. meati, over forehead	28.8	“
“ “ “ over frontal bosses	29.3	“
“ “ “ over bregma	31.0	“
“ “ “ over max. expanse of cranium	32.2	“
“ “ “ over lambda	29.0	“
“ “ “ over inion	24.8	“
Nasion-ophryon	1.7	“
“ -bregma	11.5	“
“ -lambda	23.0	“
“ -inion	30.0	“
“ -opisthion	35.6	“
Circumference max. of the skull	49.8	“
Rayons: Basion subnasal point	8.8	“
“ -nasion	9.6	“
“ -bregma	12.4	“
“ -obelion	12.0	“
“ -lambda	11.1	“
“ -inion	8.1	“
(Length-height index	70.8)	
Distance of true temporal ridges from bregma (along the coronal suture)	8.0	“
Foramen magnum: Diameter ant.-post.	3.3	“
“ lateral maximum	3.0	“
Index	90.9	
Posterior-nares: Height maximum	2.63	“
Breadth in middle	2.75	“
Index	104.5	

II

Since the above article was written and read before the American Association for the Advancement of Science at its meeting in Detroit, 1897, as well as before the British Association for the Advancement of Science at its meeting in Toronto, 1897, another instance of trephining among the Tarahumares has come to the notice of the authors.

This second trephined skull (figures 4, 5) is one of that part of the Lumholtz collection, which is in possession of the Museum of Science and Art in Philadelphia. It was obtained by Mr Lumholtz from a burial cave near the pueblo of Nararachic, state of Chihuahua, and the trephining was discovered by Dr Hrdlicka during his examination of this part of the Lumholtz collection.

The skull presents many similarities to the one first described, and, like that, it is the skull of a female about fifty years of age. Its physical characteristics, though not exactly the average, are nevertheless distinctly those of a female Tarahumare (cephalic index, 77.4; nasal index, 54.6; orbital index, 83 8); moreover, the physical characteristics of all the other skulls from the same locality agree with those of the Tarahumare.

The orifice in the skull is also situated, as in the first case, in the forepart of the right parietal. It is in this instance (measuring from the center of the opening) 2.6 cm. behind the coronal suture and 5.0 cm. below the sagittal suture.

The opening itself, however, is not round, as in the first case, but oval or almond-shape, with the blunt point forward; and the edges, which are very regular and uniform, are distinctly beveled.

The opening in its present state is almost filled with new bone, which indicates a long survival of the subject after the operation. Its size, as shown by the somewhat different color of the new bone, was about 2.2. cm. by 1.6 cm. The anterior part of the wound is much more filled than the posterior; this latter presenting a depression of the size of about one-third of the whole original opening, partly filled with cancelous bone. In the lower part of this depression there is still preserved a slit-like communication with the interior of the skull.

The parietal bone in which the opening is situated shows absolutely no sign of injury. The edges of the opening, as already stated, are regular, without any nodules, and there is no trace of any healed depression or fracture. The inner table of the skull at the place of the opening shows a number of little radiations, which diverge from the slit mentioned, indicating that otherwise this inner table is smooth, and shows no injury nor anything pathological.

That the trephining was done many years before the death of the subject, and probably in youth, is further indicated by a slight alteration of the whole right side of the head posterior to the wound. (The right side is somewhat larger than the left and seems slightly lower.)

That the wound was made by trephining, a minute and thorough examination shows beyond doubt. The method of opening the skull in this case differed, however, from that employed in the first one. The shape of the wound and the beveled edges, for which natural absorption alone could not sufficiently account, prove that in this instance the trephining was accomplished by scraping.

The finding of a second case of trephining among the Tarahumares shows that this operation was not solely accidental with these people, but that the art, even though rare, was well known to them and even practiced according to various methods.

Regarding the aim of the operation, the two specimens described offer no indication; but there are coincidences in both cases, viz, that both skulls were those of women, and that the opening in both was in the right parietal bone (a place which is very easy of access and involves comparatively little danger for such an operation); further, the absence in both cases of signs of cranial wounds and the long survival of the subjects after the operation. All these facts have a certain significance, which may possibly be elucidated in the future by the finding of other specimens.

Whence the knowledge of trephining among the Tarahumares was derived—whether from the peoples of the north or from those of Peru and Bolivia (countries prolific in specimens of this kind) or from some source common to all of these—must yet remain an open question.

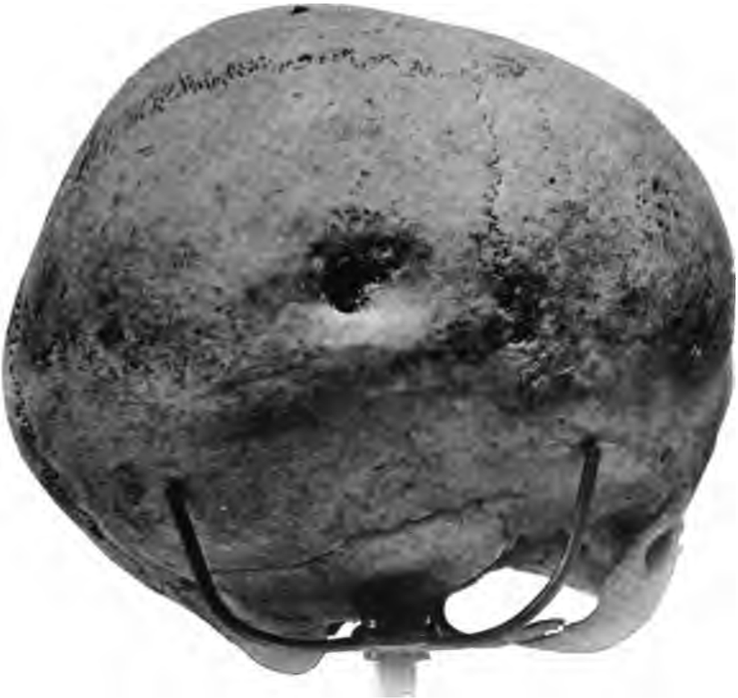

FIG. 4—TREPHINED TARAHUMARE SKULL, FEMALE
Seen from above
Mus. of Science and Art, Philadelphia, Lumholtz Coll.

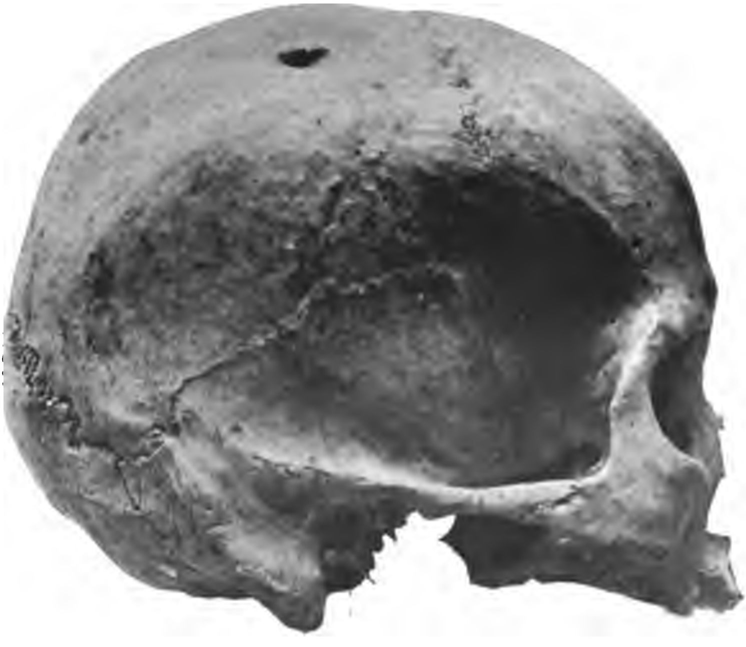

FIG. 5—TREPHINED TARAHUMARE SKULL, FEMALE
Seen from one side
Mus. of Science and Art, Philadelphia, Lumholtz Coll.

ANALYSIS OF THE DEITIES OF MAYAN INSCRIPTIONS

LEWIS W. GUNCKEL

Students who are familiar with Mayan inscriptions know the difficulty of selecting the various glyphs from the tablets and stelæ for the proper study and analysis necessary to a correct understanding of their numerous and ever-changing characteristics. In 1879 Edward S. Holden[1] devised a card catalog for the classification of the various characters and glyphs occurring in the Palenque inscriptions, using the plates (the only ones at that time published) in Stephen's *Incidents of Travel in Central America.*[2] Interesting results were obtained, from a mathematical point of view, as to the number of glyphs and their relative positions in the inscriptions; but little was known concerning the Mayan inscriptions up to that time, owing to the unreliable drawings of the tablets, mural inscriptions, and stelæ, and the impression prevailed that they could be interpreted in the same manner as we would solve a rebus, a cipher telegram, or some writing the characters of which were unknown; also many attempts were made to solve their meaning by the use of Landa's alphabet, but, it is needless to say, without success.

Since the publication of Holden's article we have added very much to our knowledge of Mayan hieroglyphs, owing to the careful investigations of Drs Förstemann, Schellhas, Seler, Brinton, Thomas, and others. The recent publication of the valuable drawings of the inscriptions in Maudslay's *Centrali Americana, Archæology*, gives access to the glyphs in a form never before known, rendering the work valuable to all students of this subject. The plates of the various inscriptions are unfortunately scattered throughout the numerous volumes, and as a result it is difficult to make comparisons. Being considerably handicapped on this account, and after much delay in trying various plans for simplifying the study and classification of the glyphs figured in the many inscriptions, it occurred to the writer that a card catalog, after the plan formulated by Holden, and using Maudslay's plates (instead of Stephen's), would greatly simplify matters. This was accordingly made, and the cards neatly arranged in a four-drawer cabinet and indexed with headings and cross-references, and the cards arranged into indexed groups of (1) Deities, (2) Day signs, (3) Month signs, (4) Classified glyphs, and (5) Unclassified glyphs, each group having cards of different tints for convenience. The five groups were then subdivided as follows: The deities were arranged into groups of similar form and indexed under the headings Deities I to XXVII; the day signs were divided into twenty groups, indexed under each day name; the month signs were divided into eighteen groups under the headings of the various month names; the classified glyphs were divided into groups under various headings, as *kin* sign, the *cosmic*, the *flint*, the *bean*, etc. The unclassified forms were grouped together for future study and analysis. By this means we have brought before us in a neat, compact shape the careful drawing of every glyph in inscriptions known to students; and by assembling them under their various classifications we can see at a glance the peculiarities of each one—its general form; ornamentation, affixes and infixes; locality, references, similarities, and relative position in the inscription. Each card is neatly labeled with the number of the part or volume, page, plate, and number, as shown in Maudslay's volume, with the locality, name, and general position of the inscription, whether on a stela at Copan (as Stela V, west face) or on a mural inscription at Palenque (as Palace House C, lintel above doorway.[1]

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[1] Studies in Central American Picture Writing: First Annual Report Bureau of Ethnology, 1879–'80, p. 208.

[2] Two volumes. New York, 1841.

It is proposed to present in this paper a classification of the profiles or heads figured in the inscriptions which, for want of a better name, we have called Deities.[2] In order to distinguish each division from the classification of the monograms of the gods in the codices, so ably worked out by Dr Schellhas,[3] who divides them as God A, God B, God C, etc, we have adopted a style of calling these profiles of the inscriptions as Deity I, Deity II, Deity III, etc. This primary classification is necessarily incomplete, as many of the forms vary to a greater or less extent from each other, while a number of the profiles are so crudely represented that it is almost impossible to classify them at all; also many forms are found occurring only once or twice in all among the numerous inscriptions examined, which for want of space we will be unable to present here. We have endeavored to show only those which appear frequently, and which seem to be of importance in the interpretation of the inscriptions. Regarding these deities, the natural opinion would be formed that they are practically the same as those found in the manuscripts or codices, and that there would be little need of a separate classification. While this is no doubt true to a certain extent, there are many variations and divergences in the method of writing and decorating the glyphs in the sculptured texts, differing more or less widely from those shown in the manuscripts, and which as a result renders the proper comparison quite difficult without some form of classification.

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[1] This card catalog has been augmented by the glyphs, not only from Maudslay's plates, but also from all other published inscriptions, and I have added numerous facsimile copies of glyphs from the codices for comparison.

[2] Regarding the human figures on the stelæ, Maudslay says: "Until the inscriptions are deciphered there is little to help us in determining whether the figures on the stelæ are intended to be portraits of chieftains or priests in ceremonial costume, or whether they are fanciful representations of heroes and deities. The strong individuality of many of the figures gives force to the former view; but, on the other hand, there are two of the figures which cannot be included in the category of monumental portraits, as their faces are covered by grotesque masks." Bio. Cent. Amer., Arch., pt. II, text p. 34; London, 1890.

[3] "Die Göttergestalten der Mayahandschriften" in *Zeitschrift für Ethnologie*, 1892.

Dr Fewkes has suggested the term cephaloglyph as being applied to those hieroglyphs which are simply conventionalized pictures of heads, either of gods or animals, as found in the Mayan codices. This will apply equally well to those pictures or profiles which occur so frequently throughout the mural inscriptions and on the stelæ and altars of the Mayan ruins. He further adds that the hieroglyphs of the different gods often contain as an important component the cephaloglyph of that god, and that they are easily distinguished from the day signs (hemeroglyphs), numerical signs (metroglyphs), and others.[1] He calls attention to the fact that it was customary in many parts of Central America, as in other localities, for the divinities to be personified in ceremonials by men wearing grotesque masks bearing symbolism of those divinities. He thinks that many of the heads of these divinities depicted in the codices[2] are really ceremonial masks or representations of the same. It is a disputed question as to whether this term should be applied to many of the mask-like profiles which are found so frequently in the codices and mural inscriptions. Dr Brinton[1] does not agree with the conclusions of Dr Fewkes on this point. Valentini tells us that the tapir-mask is still employed in a "ballet" of the "Zayi" dance,[2] and this is especially interesting, for the tapir nose occurs very frequently in the profiles of the inscriptions. It is also the opinion of Dr Brinton[3] that, having the mythologic or religious lore of the Mayas in one's memory, it is not difficult to identify most of the pictures presented in the codices. The fact that this has not been accomplished at a much earlier date he attributes to a neglect of the myths by previous writers and a persistent desire to discover in the mythology of the Mayas, not the divinities which they themselves worshiped, but those of some other nation, as the Nahuas, Quiches, Zapotecs, or pueblo-dwellers. He believes that we should pay less attention to the mythologies of these other nations, and apply ourselves strictly to the religion of the Mayas themselves, before any results of value can be obtained.

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[1] "The God D in the Codex Cortesianus:" *American Anthropologist*, July, 1895, foot-note 1, p. 209.

[2] Op. cit., foot-note, p. 206.

Maudslay[4] believed that all the inscriptions which are complete from the commencement are headed by what he calls "an initial scroll" (the type of which is permanent throughout many variations), and that they begin with the same formula, usually extending through six squares of hieroglyphic writing. He points out that the sixth square or sometimes the latter half of the sixth square is generally a human face, usually in profile, inclosed in a frame or cartouch. The general arrangement of the profiles in the inscriptions is a point well worthy of attention. A series of portraits, usually occupying six squares, is often found grouped at the beginning of each inscription, while others are found scattered indiscriminately throughout the texts. Valentini[5] asks why this was so arranged, and suggests that there must have been some grave reason which caused the artist to arrange them both in columns and separated in the texts. He was of the opinion that the profiles scattered throughout the text were separated by a series of glyphs representing objects of ritual class, consisting of dates, vessels, idols, and sacrificial gifts; that in spaces of longer dimension there are found more of the same class, and that they change somewhat in size, form, or in minor details, but that the motive of the object remains unchanged. He believes, for instance, that the left side of the "Tablet of the Cross" was inscribed with an epitomized record to state how many priests had deceased since the foundation of the brotherhood, and that each of these squares had to show (1) the image of the priest, (2) those sacrificial vessels that he had been appointed to attend to, (3) the image of the respective idols, (4) the gifts offered, and (5) the dates on which the sacrifices were performed. Supposing for a moment that these conclusions are correct (although we feel that they are yet susceptible of proof), the wrong method or direction of reading the inscriptions is used. Valentini was of the opinion[1] that the Mayan hieroglyphs should be read in double columns down to the point where the double portrait column ceases, and from there in the columnar direction—from top to bottom—or, in other words, in single columns, with the exception of the portrait series. This method we think we have demonstrated by sufficient evidence, in a former article[2] on the same subject, to be incorrect.

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[1] A Primer of Mayan Hieroglyphics: Univ. of Penna. Pubs., 1896, foot-note, p. 55.

[2] An Analysis of the Pictorial Text Inscribed on Two Palenque Tablets: Proc. Amer. Antiq. Soc., Oct. 23, 1895, pt. I, p. 22.

[3] Op. cit., p. 50.

[4] Exploration of the Ruins and Site of Copan, Central America: Proc. Royal Geog. Society, Sept., 1886, vol. VIII, No. 9, p. 593.

[5] Op. cit., pt. II, p. 19.

An important fact which has been noted by several students of the manuscripts is that the figures of codices Cortesianus and Troano are delineated with less care than those of Dresdensis and Peresianus; and it is interesting to note that this is also true of the graven texts. Some inscriptions are elaborately carved with profuse ornamentation and decoration, as at Copan, while others are depicted with less care and in simplified forms, as at Chichen Itza. Fewkes is of the opinion[3] that. although this difference at times presents many difficulties, it seems to have likewise many advantages as showing the simple symbolism intended to be expressed, for, as he says, in the less elaborated work the essential symbolic markings would disappear last of all. We think, however, that it may be of aid to other students of this subject to suggest a primary classification of the profiles found so commonly in the sculptured texts. At this time, however, it must be, of necessity, incomplete, as only seven volumes of Maudslay's plates have as yet been published. Almost the whole series of the Palenque texts have yet to appear,[1] and in consequence we are compelled to omit many of the forms that are found in those tablets, owing to the poor plates to which we must refer until the publication of these long-looked-for volumes.

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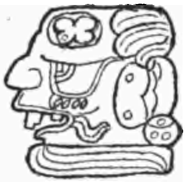
[1] Op. cit., pt. II, p. 6.

[2] The Direction in which Mayan Inscriptions Should be Read: *American Anthropologist*, May, 1897, p. 146.

[3] A Study of Certain Figures in a Mayan Codex: *American Anthropologist*, VII, No. 3, July, 1894, foot-note, p. 263.


I.

Deity I—The prominent character of this deity is the elongated looped back tooth (?) which curves downward and then upward, the end pointing about to the ear. The tongue often appears at the half-closed opening of the mouth; the nose is regular, broad, and full; the eye is prominent, with a decorative line curving upward, under which are three or four balls or dots. It is often associated with the symbol for the open right hand, showing palm and thumb with extended fingers; sometimes with the so-called "spectacles" glyph, and the so-called "cosmic" or 20 sign. It seems to be more common at Palenque than at other points. Of the twenty-eight forms noted, nine are from Copan, one from Chichen Itza, and eighteen from Palenque. It has no conspicuous associations or affixes, with the exception of a sign resembling the south or yellow sign without the center dot, with which we find it five times. It occurs four times as the second character of double-head glyphs, and twice has the symbol of the hand as a prefix. It is found as the second character in the portrait series, at the head of Stela J and as the fifth on Stela I. The fifth character of the portrait series on Stela M shows its characteristic mark—the south or yellow sign without the center dot (this is also shown in the latter half of the fifth character on the "Tablet of the Cross")—while the fifth character on Stela B, Stela A, Altar S, and Stela N resemble it, with the exception of the tooth turned backward.

Deity II—Probably the most common deity occurring in the inscriptions. The nose is generally long and narrow, resembling greatly the trunk or proboscis of a tapir;[1] immediately above this nose is invariably found a peculiar symbol, much resembling an inverted question-mark; the mouth is generally open, showing a protruding narrow tongue. This caricature of a profile is often supported by a hand, as in the act of holding it, in the palm of which are often found two concentric circles. It must not be confounded with the somewhat similar Deity III, the only difference being in the latter having a protruding looped or curved tooth at the back of the mouth, or with Deity IV, which has neither the appendage over the nose nor the curved tooth at the rear of the mouth. We have noted in the card catalog no fewer than one hundred and six occurrences from which to draw our comparisons—twenty-seven from Palenque, four from Chichen Itza, and seventy-one from Copan. Fourteen of these from Copan have the supporting-hand symbol directly under the profile, generally taking the place of the lower jaw. Its prefixes and superfixes differ in almost every glyph, making it almost impossible to classify them. It is found as the first character under the initial heading of the portrait series—Stela M, Stela A, Altar K, Altar S, Altar R, Stela N, and Stela P (east face)—a total of seven times as the first character. It also occurs as the fourth character on Stela P.

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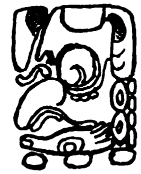
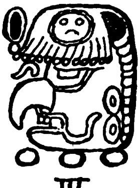
[1] In a recent letter received by the writer from Mr Maudslay he states that another volume on Palenque is now in the press and will be issued in the fall (1897), and that, although the drawings take a long time, all the Palenque tablets will be given and will appear as soon as possible. We are much indebted to him for forwarding to us the advance proofs of some of the most interesting of the inscriptions.



II.



III.

Deity III—This character, with one important difference, is closely similar to that one classified as Deity II. In this form we find the protruding downward loop or curved tooth in the back of the mouth which is never found in Deity II. It has, however, the same long tapir-like nose or snout, together with the scroll-like appendage directly above the nose, resembling a half-inverted question-mark. It seems to occur more frequently at Copan than at other points, as we find it in the inscriptions there forty-five times and at Palenque in thirty places—a total of seventy-five times. Its prefixes and superfixes differ in almost every case, rendering it difficult to classify them. It occurs often in connection with some profile of other deities in double form. It is found as the first and second characters under the initial heading of the portrait series on Stela I, the second character on Stela N, Stela J (east face), and Stela E, or a total of four times as the second character. It also is found as the latter half of the first and also the fifth character on Stela P, and as the fourth character of Stela P (east face); and Stela I. I desire to record at this point my belief that Deity III of the inscriptions is identical with the character so common in the codices which other students have designated the "Long-nose God."[1] According to Fewkes, we are justified in the adoption of the head as a basis of classification in the comparative analysis of these Mayan deities,[2] and from this alone our conclusion is reasonable. In it we find the principal characteristics of the "Long-nose God" as follows: (1) The nose is a curved prolongation hanging down in front of the mouth and curving outward; (2) a single curved body hanging downward from the angle of the jaws; (3) tooth-like bodies in the upper jaw, and absence of teeth on the lower jaw; (4) the peculiar curved decorative appendage directly above the nose like an inverted question-mark with the loop or hook curving upward over the nose. We admit that the trifid ear, the S-shape figure bounding the eye with rectangular marginal blocks, and the appendages to the top of the helmet-mask are generally missing in the glyphs in the inscriptions, but the resemblance is unmistakable notwithstanding. Head-dresses are seldom shown in sculptured glyphs and are of little value in the determination of the classification. Another point greatly in favor of this identification is the fact that they both are found more frequently than any other deity, both in the codices and also in the inscriptions.

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[1] Waldeck identified the tapir snout on the masks and statues at Palenque, and further says that he found the animal still venerated by the natives. Seler and Brinton also identify the figures in the codices as having the tapir nose. Thomas calls the form shown in the codices as "elephantine," which, according to the above identifications, is undoubtedly incorrect.

Deity IV—This character has the elongated tapir-like nose, with a short under lip, leaving a mouth much like that of a turtle, showing several teeth. The eye is wide open, and often has three dots arranged in triangular form in it. Its affixes are variable, often being the flint or numeral signs. The exact form of the profile is also variable, but it always has the tapir-like nose, without the loop above, as in Deity II, or the curved backward tooth below, as in Deities I and III. It is found twenty-four times at Copan, twelve times at Palenque, and twice at Chichen Itza. It is found as the first, second, and third characters under the initial heading of the profile series on Stela B; as the first, second, and third on Stela A; as the second and third on Altar S; as the third on Stela I, Stela N, Stela M; as the first and third on Stela J; as the latter half of the third on Stela P—a total of eight times as the third character of the portrait series.

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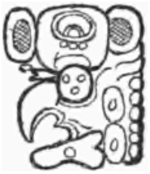
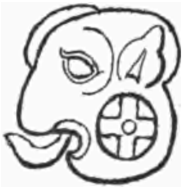
[1] "The Long-nose God" was considered by Brinton and also by Thomas as the representation of *Itzamna*. Schellhas believed it to be Cukulkan, while Brasseur do Bourbourg, and later Seler, thought that it was "Tlaloc" or Chac, *i. e.*, a Rain god. Fewkes concludes that it is a "Snake" Rain god, and also that it is probably Cukulkan.

[2] Op. cit., July, 1894, p. 261.



IV.

Deity V—A protruding tongue, generally curved upward, is the most prominent feature of this character, together with the symbol for "south or yellow," which is almost invariably found just below the ear. The eye and features are usually severe and stern. It occurs commonly on the "Palenque Tablet of the Cross," and also on the stelæ of Copan, and has not been recorded at Chichen Itza or at other points. It is often associated with the "spectacles" glyph, the north direction sign, the eagle head, etc. It is found nineteen times on the inscriptions at Copan and thirteen times at Palenque.[1] Valentini[2] was of the opinion that this glyph represented a parrot with outstretched tongue, and calls attention to its numerous occurrences in the "Tablet of the Cross," where it is found in S 8, S 17, T 1, V 12, V 16, W 4, X 3, X 9, and X 17. If we examine these glyphs carefully, especially the ones on stelæ at Copan, it will readily be seen that they resemble the human profile much



V.

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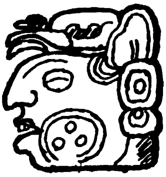
[1] Regarding this glyph in the Palenque series, Holden says: "It consists of a head in profile, the tongue protruding from the mouth, a circle with four segments marked off in it, accompanied by an oval having its center hatched over by cross-lines to represent the skin of a serpent, this oval being surrounded by a conventional sign of feathers or plumage. The whole is a portrait of *Cukulkan* (Mexican Quetzalcoatl), meaning in both languages 'snake plumage.' This person introduced the practice of wounding the tongue at sacrificial feasts (hence the protruding tongue); he was one of the inner circle of gods for want of a better name 'the gods of hell.' The circle with its cut-off segments is the conventional sign for the family. The *rebus* of his name is given in the oval with its cross-hatchings and its feathers, so that any native describing what he saw (*Cukul*, feathers; *Kan*, serpent) pronounced the name of the god. The Hieroglyphics of Central America;" *Century Magazine*, vol. I, p. 229.

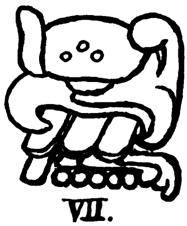
[2] Op. cit., pt. II, p. 14.

more than that of a parrot. We think that he is incorrect in calling this character a parrot. But three lines above this statement he includes the square S 8 as among the representatives of the bird *eb*, and names a number of other representations exactly like the character S 8 as forms of the bird *eb*. It cannot certainly represent both forms at the same time. A few lines below this he sees in T 10 the *eagle* devouring a piece of carrion. Does an eagle eat carrion? Perhaps the name vulture or turkey-buzzard would be more appropriate under the circumstances.

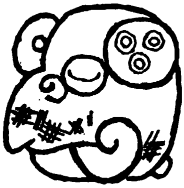
Deity VI—This character has a round, full face, large, broad nose, eyes half closed, mouth sometimes closed and sometimes open, with thick, protruding lips. The ear is profusely decorated and ornamented. The most conspicuous marking on the profile is the group of dots near the mouth, arranged in circular or semicircular form, or three dots in triangular form. We have noted only seven occurrences on the Palenque inscriptions.


VI.

Deity VII—A profile greatly resembling that of a baboon or monkey, showing huge teeth protruding from the upper jaw. We find five occurrences at Copan, two at Chichen Itza, and six at Palenque. Its affixes are variable and are unimportant for determining classification. It resembles greatly a mask used in religious ceremonies rather than a portrait.

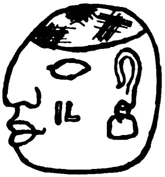

VII.

Deity VIII—The most noticeable feature in this character is the curved, rounded, tooth-like decoration extending from the back of the mouth, differing from all forms found. Another prominent feature, occurring in nine forms, is the circular symbol directly over the ear, inclosing three smaller circles placed in a triangular position. This deity, as a rule, has an important position in the inscriptions and often is found as the fourth character under the initial heading of the portrait series at the head of many of the inscriptions. We have noted eighteen occurrences for this character on the inscriptions at Palenque and thirteen at Copan. The affixes are variable, being of both numeral and other signs, none occurring often


VIII.

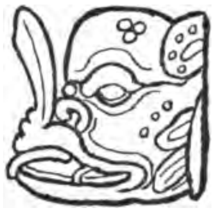
enough to be noticeable. It often is found connected with other deities in double-form glyphs. This character occurs as the fourth one under the initial heading of the portrait series in Stela B, Stela A, Altar S, Stela I, Stela M, Stela J, and Altar K—a total of seven times.

Deity IX—This profile has a round, full face, large, broad nose, thick lips, closed mouth, and an ear somewhat resembling a shepherd's crook. A peculiar broad ear ornament is hanging from the ear by a ring. It does not occur frequently, only seven instances, all from Palenque, having been noted.[1]



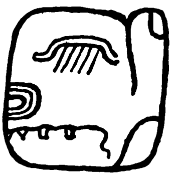
IX

Deity X—This character has ofttimes a horned ear, and almost invariably a horn-like appendage, extending upward, in the place of the nose, and an open mouth, showing a row of upper teeth of peculiar shape. Extending from the mouth and curving upward is a combination of lines and dots, sometimes connecting the character to the "south" or "yellow" symbol. A circle of dots is often found about the ear or between the ear and the mouth. It has commonly associated with it as a superfix the *ben ich* sign (nine times noted). It seems to be found more frequently at Copan than at other points, as we find it there twenty-six times, nine times at Chichen Itza, once at Ak At'Cib, and eight times at Palenque.



X.

Deity XI—This glyph is of peculiar shape, being that of the back of a human hand, with the thumb showing the nail, standing erect at the right side. Inside of this hand-shape character is marked the profile of a human face. Two of them are usually written, one immediately below the other. It seems to occur more frequently at Chichen Itza and Palenque than at any other points, and it is found very often in the inscriptions on the lintels of the doorways at Casa de Monjas. We find it at Chichen Itza thirty times (nine times in double forms) and twenty times at Palenque. It resembles very greatly the "God



XI.

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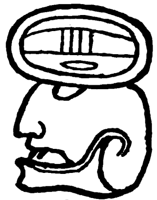
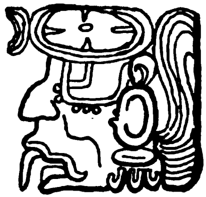
[1] See Maudslay, vol. IV, pt. 7, pl. 44, No. 2; and vol. IV, pt. 6, pl. 6, No. 4.

A" of Schellhas' alphabetic classification, which many students believe to be the "God of Death." This deity also occurs in double form in the codices and often has the bean or flint prefix or subfix.[1]

Deity XII—A profile, always having the *pax* sign for a superfix and ofttimes the bean sign for a postfix. The features of the profile resemble that of an old man, showing a slightly opened mouth, with a few short teeth extending from the upper jaw. The nose is prominent and slightly hooked. A series of circular decorations represent the ear. With the exception of the *pax* sign immediately on top of the head in the place of a cap, and sometimes the bean sign for a postfix, there are seldom any affixes of any kind whatever. It occurs rarely in the inscriptions, several forms being found at Chichen Itza, Copan, and Palenque. This character greatly resembles Schellhas' monogram for "God N"—"the god with the features of an old man." His face and peculiar head-dress, with the *pax* sign, are very similar, both in the codices and inscriptions.


XII

Deity XIII—This profile is of a peculiar form. A protuberance somewhat resembling a tongue hangs down from the front of the mouth, which is partly opened. The nose is prominent and slightly hooked. A rectangular decoration of lines and dots represents the eye. In one instance this deity has the *kin* sign for superfix and in two instances has the inverted trinal sign, to which is added a decorative sign, somewhat resembling the *ual* month sign, as a postfix. The trinal sign occurs on one form as a prefix. Only four instances have been noted in the inscriptions, all of which are from Chichen Itza.


XIII

Deity XIV—The features of this profile are variable, all of them, however, exhibiting the prominent broad nose and low, retreating forehead and the round, full face. Directly above the forehead there is ofttimes a decorative scroll, curving downward, and sometimes a sign resembling a combination of *kan* and *ahau*. The ear ornament is massive and of various designs, and many of the profiles have a cap-like covering over the head as shown in the cut. Many forms which somewhat resemble this deity occur throughout the inscriptions, each differing, however, in some important detail, but which for convenience we may temporarily classify under this heading. We have noted ten occurrences in the Copan inscriptions, thirteen at Palenque, and two at Chichen Itza.

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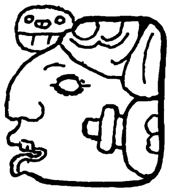
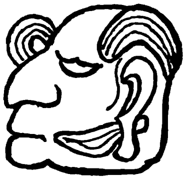
[1] Compare the form from the inscriptions with figure 4, p. 121, in Brinton's "Primer."



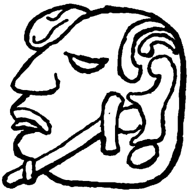
XIV.

Deity XV—This profile has a large, prominent nose and the mouth is usually partly open. The most characteristic mark is the ear decoration, having a decorative object projecting through the ear, greatly resembling a leaf or flower in bloom. It does not occur often in the inscriptions, and but three are found at Copan, one at Chichen Itza, and six at Palenque. There is often a decorative scroll directly above the forehead.



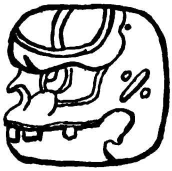
XV.

Deity XVI—A profile showing a round, full face, large, prominent nose, half-opened mouth, showing teeth in upper jaw or sometimes the tongue without the teeth, and profuse ornamentation attached to the ear. Some instances have a circular dot on the cheek between the mouth and the ear. There are a number of profiles in the inscriptions resembling the general features of this deity, but the ear ornaments seem to differ slightly in almost every case. We find twelve occurrences at Copan and four at Palenque.



XVI.

Deity XVII—A mask-like profile, showing usually two or three small teeth protruding from the upper jaw. The mouth is usually entirely closed or nearly closed and extends far back into the profile, ending with a decorative curve downward to the base of the head. In place of the ear is often found a half-inverted symbol greatly resembling the division sign.[1] This deity does not occur fre-



XVII.

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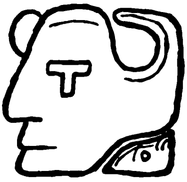
[1] Former students have been unable to explain the meaning of this sign which is found in the Mayan codices, and also in Mexican pictography, but Brinton was of the opinion that it represents a *maggot*. In the codices it is often associated with the pictures of the "God of Death."

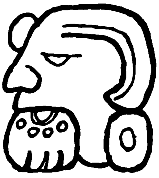
quently in the inscriptions at Copan, seven being noted on the Chichen Itza inscriptions and seventeen at Palenque.



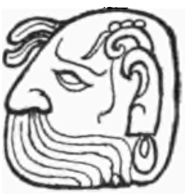
XVIII.

Deity XVIII—A profile occurring but seldom in the inscriptions, only three having been noted—two at Chichen Itza and one at Copan. The most prominent characteristic is the *tau*-shape eye, such as is shown in Schellhas' monogram B, which Brinton considers as the hieroglyph for Itzamna—"the god with the snake-like tongue."[1]

Deity XIX—This glyph invariably has an object held conspicuously in the open mouth, ofttimes a large *imix* sign. It is frequently associated with the "spectacles" glyph as a superfix and the "trinal sign" as a prefix. The features are not marked; the eye is long and half closed; the nose broad and prominent. Directly under the ear is often found two concentric ovals. At the top of the forehead, curving down to where the ear should be, are two decorative lines somewhat resembling a ram's horn connecting with the back of the head. It is found more commonly at Copan than elsewhere, four forms being noted on the inscriptions from there, and only three at Chichen Itza and two at Palenque.

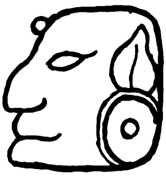


XIX



XX.

Deity XX—A prominent curved nose with a decorative design directly over the forehead form the most striking features of this character. The under lip is hidden by a row of wavy, tongue-like protuberances extending from the mouth downward. At the back of the head is often a decorative sign greatly resembling the *ual* month sign. The ear decoration greatly resembles a double shepherd's crook, to which is hung a ring-shape ear-pendant. The wavy design in place of the lower jaw greatly resembles an inverted *ual* sign. Only three forms were noted, two from Copan and one from Palenque.



XXI.

Deity XXI—This profile shows a prominent, broad nose, closed mouth, and regular features, with no conspicuous characteristics. Many forms resemble it to a more or less extent, but all vary in some decoration or ear ornament, making the classification difficult. Many forms show the concentric circular decoration below the ear, which is often of leaf shape. We find thirteen glyphs resembling this deity at Copan, seven at Chichen Itza, and several at Palenque.

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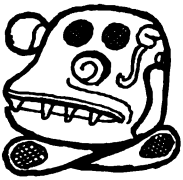
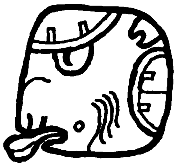
[1] Op. cit., 1896, p. 122, figs. 8 and 9.

Deity XXII—This glyph greatly resembles the profile of a monkey or some mythologic animal, with a low forehead, protruding eyes, and a row of three or four fierce, sharp teeth extending down from the upper jaw. In four of the characters there are two or three circles containing cross-hatching about the head. In two of the glyphs there are rows of dots around the top and back of the head. Nine cases only have been found, all of which are on the stelæ at Copan.



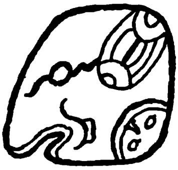
XXII.

Deity XXIII—A glyph found more frequently at Chichen Itza, having a decorative design on the top and at the back of the head. This design seems to vary in shape in each profile noted, but is easily recognizable on account of its rarity in the sculptured texts. We find only eight occurrences in all, of which five are on the mural inscriptions at Chichen Itza (two of these have the *ben ik* sign as a superfix) and three at Palenque.



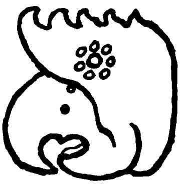
XXIII.

Deity XXIV—The flint sign is commonly associated with this character, in one instance being placed prominently over the ear,[1] with the half-inverted *ahau* sign directly underneath. With the exception of the tapir snout or nose, the open mouth, and the exceedingly short under lip, the features are not conspicuously marked. It is found more frequently at Copan than at other points.



XXIV.

Deity XXV— A form greatly resembling Schellhas' monogram R, which is thought by most authorities to represent the *moan* bird. It has a long, curved beak, greatly resembling that of a parrot or owl, and the tufts of feathers



XXV

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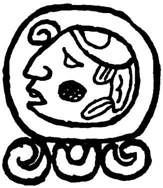
[1] Maudslay, pt. III, p. 72, No. 11.

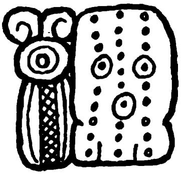
at the top of the head greatly resembling horns. We find three occurrences at Copan and one at Palenque.

Deity XXVI—This character almost invariably shows a face inside of a frame or cartouch resting on the three legs of a brazier.[1] It occupies often an important position in the portrait series, generally being number six of the group directly under the huge *pax* sign. The nose is large, broad, and slightly curved, the mouth closed in some and open in others, the lips thick and protruding. The ear is often decorated with an elaborate ornament. The head in some cases seems to be covered with a cap, with a tassel hanging down below the ear.[2] This character is the one to which Maudslay[3] calls attention as being one of the group following the initial scroll and making up the formula which usually extends through six squares. The face in the cartouch sometimes assumes a form resembling an *ahau* sign. It occurs as the sixth character under the initial heading on Stela B, Stela A, Altar S (*ahau* form), Stela I, Stela N, Stela M (*ahau* form), and Stela P—a total of seven times as the sixth character of the series.



XXVI.

Deity XXVII—This character shows the front view of a face covered with rows of dotted lines, showing the two orbs and a mouth, but no nose. It has the north directive sign for a prefix, and its general appearance is always the same. Only three occurrences have been noted, all being on the right-hand side of the Palenque "Tablet of the Cross." This character resembles a mask rather than the profile of a human face.[4]



XXVII.

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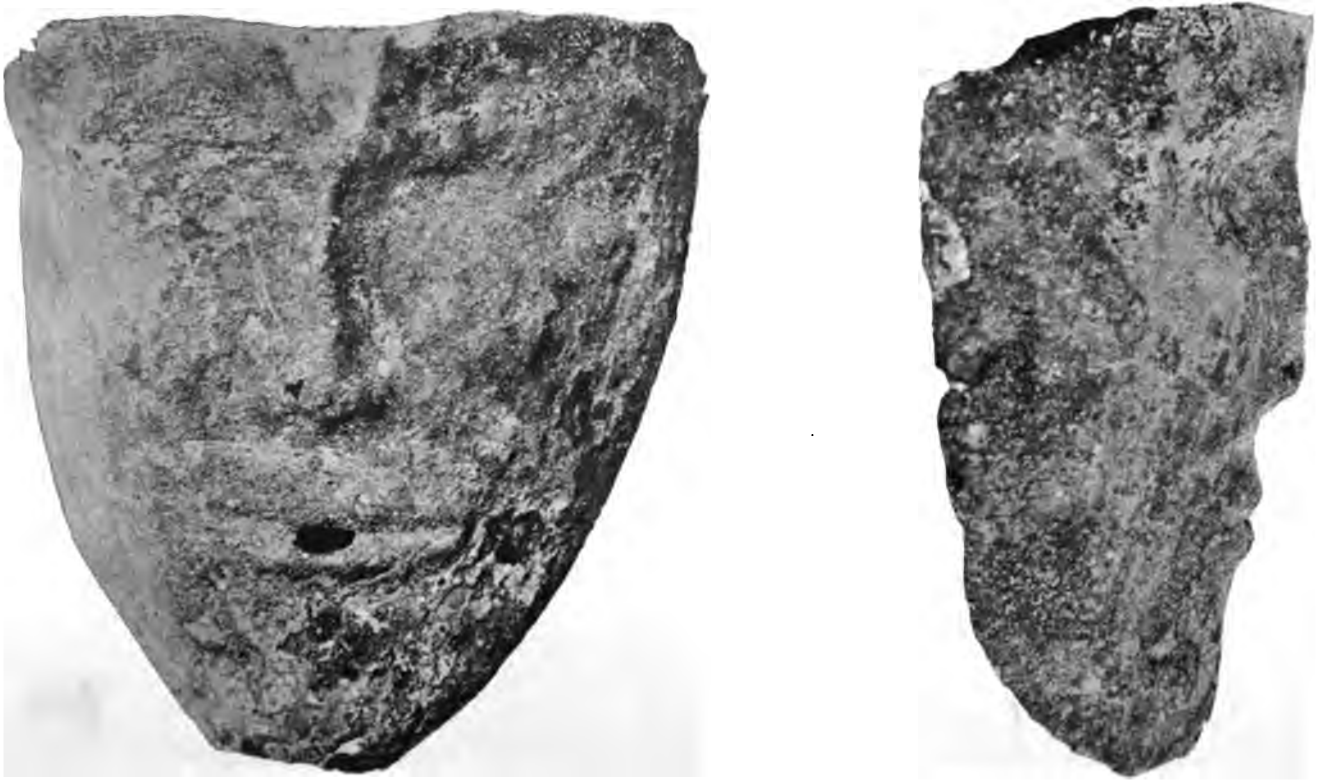
[1] These three feet closely resemble the tripod feet of Central American vessels, which Valentini calls braziers. Saville calls them the "three knobs."

[2] Maudslay, pt. IV, pl. 23, No. A4.

[3] Op. cit., p. 593.

[4] See Palenque "Tablet of the Cross," in T 11, T 13, and T 16.



FRONT AND SIDE VIEW OF A COPPER MASK FROM CHIMBOTE, PERU

A COPPER MASK FROM CHIMBOTE, PERU

GEORGE A. DORSEY

So far as I can learn, masks (using the term in its literal meaning) are not commonly found in the prehistoric graves of Peru. That masks were in use in various ceremonies and played a prominent part in the sacred ritual of the Peruvians no one can doubt, as masks of different kinds are portrayed over and over again in their pottery, especially in that from the regions of Chimbote and Texillo.

The mask which I am to describe is, I believe, unique. It was found inside the wrappings of a mummy pack in a moderately deep grave in the plain just east of the present town of Chimbote, in Santa valley. This valley for an extent of thirty miles is thickly dotted with ancient cemeteries, and from their graves literally thousands of pieces of fine earthenware and other objects have been taken and are now scattered among the museums of the world. Owing to the extreme old age of the grave and the decayed condition of the wrappings of the mummy pack, it is now impossible to say whether the mask was placed over the face or not. It is fair to presume, however, that it was in immediate contact with the face, for the inner surface is fairly bright and clean, while the outer surface is somewhat corroded and has imprinted upon it markings of a loose cotton fiber, which usually was wrapped around the head and over the face.

The mask has been hammered from a single nugget of copper, and to get the required shape a mold or block has been used. As may be seen in the full or the front view, all the features are well formed and distinctive with the exception of the nose, that feature being pinched and dwarfed. The two holes at the tip of the nose are the result of corrosion. The aperture designed for the mouth has been made with a punch, as is shown by the ragged edges within. The mask measures 158 mm. in maximum length; its maximum breadth is 153 mm.

Seen in profile, the mask shows strong, regular features, except—as has been noted—the nose. The cheeks are prominent and fairly outstanding.

The upper outer corners on both sides of the mask are somewhat damaged, but enough remains on the left side to show that this corner was originally pierced. There was probably a corresponding hole in the opposite corner, and it is not unlikely that these served to receive the ends of a cord which passed around the back of the head and held the mask in place. Whether this mask was worn in life and what purpose it served, or whether it was a funeral object pure and simple, I am not able to determine

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BOOK REVIEW

Report of Field Work Carried on in the Muskingum, Scioto, and Ohio Valleys during the Season of 1896 for the Ohio State Archæological and Historical Society. By Warren K. Moorehead. 8°, pp. 165–274.

This is only a report of field work carried on during the year 1896 under the auspices of the state society, and does not purport to give full details of the discoveries made, yet it contains many items of interest to the archeologist. It is true that a number, probably a majority, of the mounds explored yielded few, if any, important relics or remains; yet this negative evidence is of value, as it will assist in the future in making up the statistics of archeology, a work yet to be undertaken and on which important conclusions must be based. "Negative mounds," if we may use the term, are disappointing to the explorer, yet they have a bearing in the study of archeology which should not be ignored. Mr Moorehead's examination of these minor works and hitherto overlooked monuments is therefore to be commended, as without this seemingly fruitless labor the archeological survey of Ohio can never be complete. Some of the mounds were more fruitful, and although yielding no decidedly new types, have added something to our knowledge of the archeology of that state.

However, in judging of Mr Moorehead's work, we must bear in mind that the primary object he had in view in making these explorations was to obtain data for an archeological map of Ohio which he is preparing, the opening of mounds being incidental thereto.

The groups and separate monuments located up to January 30, 1897, which will require characters on the map, amount to 2,843, representing about 6,500 individual monuments. An interesting item inserted by Mr Moorehead as forming the basis of this estimate is the average number of individual monuments to the groups of the different sections. For example, in the Scioto valley the average is 4½; in Muskingum valley, 2½; Great Miami, 2½; Little Miami, 2; Brush creek, 2, and along the Ohio from Steubenville to Cincinnati, 1½. Every county in the state is represented in the list, the number varying from 231 in Ross to 1 in Logan, Shelby, and some other counties. As the map is to be of sufficient size to allow the insertion of appropriate emblems for the several groups, it will form a valuable basis for future archeologic work in the state. It is therefore to be hoped that Mr Moorehead will receive such aid and encouragement as will enable him to complete this important work according to the plan proposed.

It may not be amiss to suggest that photographs of mounds and other ancient works are as a rule of comparatively little value to the archeologist; ground plans, especially of groups; drawings, if carefully made, and vertical sections convey more information to the reader.

CYRUS THOMAS.

HOME OF THE TROGLODYTES.—In the Douai version of the Old Testament, II Paralipomenon, XII, 2–3, we read how Roboam, King of Judah, was attacked by Senac, King of Egypt, accompanied by "people out of Egypt, to wit, Libyans and Troglodytes and Ethiopians." This dates from 1609. In the version published under King James, the same passage reads: "The Lubims, the Sukkiims, and the Ethiopians." (II Chronicles, XII, 3.)

It is interesting to learn on biblical authority the home of the Troglodytes. The occurrence of this name for cave-dwellers at so early a period need not excite surprise, for Herodotus mentions Troglodytes, and Pliny wrote: "Crates of Pergamus saith likewise that the Troglodytes above Ethiopia be swifter than horses." (Holland's translation, London, 1634.)

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